

## **Challenge TB - Bangladesh Year 2**



### **Annual Report October 1, 2015 – September 30, 2016**

**November 7, 2016**

**Cover photo: September 29, 2016:** The Challenge TB team and local workers spent all night placing a containerized lab in Sylhet to improve TB diagnosis and treatment in Bangladesh. (Photo credit: Ashish Kumar Ghosh)

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## **List of Abbreviations and Acronyms**

ACF	Active case finding
ACSM	Advocacy, communication, and social mobilization
APA	Annual plan of activity
BADAS	Bangladesh Diabetes Association
BPA	Bangladesh Pediatric Association
BRAC	Bangladesh Rural Advancement Committee
BEPZA	Bangladesh Export Processing Zones Authority
BIRDEM	Bangladesh Institute of Research on Diabetes, Endocrine, and Metabolic Disorders
cPMDT	Community-based programmatic management of drug-resistant TB
CCM	Country Coordinating Mechanism
CDC	Chest Disease Clinic
CDH	Chest Disease Hospital
CTB	Challenge TB
CTB, B	Challenge TB, Bangladesh
CWCH	Centre for Woman and Child Health
DGHS	Directorate General, Health Services
DOT	Directly Observed Treatment
DOTS	Directly Observed Treatment, short-course
DQA	Data quality assurance
DR-TB	Drug-resistant TB
DS-TB	Drug-sensitive TB
DST	Drug susceptibility testing
FAST	Finding TB cases Actively, Separating safely, and Treating effectively
EQA	External quality assessment
EPTB	Extra Pulmonary TB
FM	Fluorescence microscopy
GF	Global Fund for AIDS, TB, and Malaria
HCW	Health care worker
HRD	Human resources development
HRM	Human Resource Management
ICAAP	International Congress on AIDS in Asia and the Pacific
ICDDR,B	International Centre for Diarrhoeal Disease Research, Bangladesh
IC	Infection control

ICF	Intensified Case Finding
IEC	Information, Education and Communication
IPC	Infection, Prevention and Control
IPT	Isoniazid preventive therapy
IRD	Interactive Research and Development
ISTC	International Standards of TB Care
KNCV	KNCV Tuberculosis Foundation
LED	Light-emitting diode
M&E	Monitoring and evaluation
MDR-TB	Multi-drug resistant TB
MOH	Ministry of Health
MOHFW	Ministry of Health and Family Welfare
MSH	Management Sciences for Health
NFM	New Funding Model
NGO	Non-governmental organization
NHSDP	NGO Health Service Delivery Program
NIDCH	National Institute of Diseases of the Chest and Hospital
NNS	National Nutrition Services
NTBLC	National TB Laboratory Committee
NTP	National TB Program
NTRL	National TB Reference Laboratory
OP	Operational Plan
PM	Program Manager
PMDT	Programmatic management of drug-resistant tuberculosis
PPM	Public-Private Mix
R&R	Recording and reporting
RTRL	Regional TB Reference Laboratory
SAM	Severe acute malnutrition
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
SMC	Social Marketing Company
SOP	Standard operating procedure
STTA	Short-term technical assistance
TB	Tuberculosis
TB/DM	TB/Diabetes Mellitus

TLCA	TB Leprosy Control Assistant
ToR	Terms of reference
TOT	Training of Trainers
UPS	Uninterrupted power supply
USAID	United States Agency for International Development
VCT	Voluntary counseling and testing
XDR-TB	Extensively drug-resistant TB

## 1. Executive Summary

To support the National Tuberculosis Program (NTP) of Bangladesh in achieving the goals of its National Strategic Plan, USAID funds Challenge TB, Bangladesh (CTB,B) as part of the 5-year global cooperative agreement. CTB,B is building on many of the successes of TB CARE II/Bangladesh's efforts and other successful innovative initiatives in the country. The coverage of CTB is nationwide, covering all seven Divisions in Bangladesh, and includes significant activities through eight sub awardees. The activities under CTB,B were implemented during APA2 by Management Sciences for Health (MSH) with technical support from KNCV Tuberculosis Foundation (KNCV) and significant local partnerships to increase the project's reach and impact.

The project works to 1) Improve access to quality patient-centered care for TB, TB/HIV, and MDR-TB services through quality of care; 2) Prevent disease transmission and progression through case finding (all kinds) and 3) Strengthen the TB platform through leadership, financing-M&E, and research.

### *Case Finding*

An estimated 20% of the MDR-TB cases were detected last year and the overall estimated case detection rate is only 53%. The Government of Bangladesh (GOB) aims to increase case notification from 53% to 75% by 2021, with a 2017 target of 217,000 cases notified (CNR 134/100.000), up from 196,717 cases notified in 2014 (CNR 124/100,000). (Source: approved PMP). CTB supported case finding activities focused on areas with particularly low case finding, gaps in coverage from Global Fund, or for at-risk populations, such as diabetics.

Pediatric case finding in Bangladesh is low – only 3.58% of all TB cases were pediatric nationwide in 2015. Therefore, CTB engaged a key partner to train pediatricians in Sylhet Division on not only the key signs and symptoms of TB, but also teaching them that children also contract the disease, not just adults. In Sylhet, more than 5% of the TB cases found this project year were among children, significantly better than the national average for 2015. Overall CTB's grantees found 5,600 of the 6,500 pediatric cases nationwide.

### *Prevention*

Isoniazid Prevention Therapy (IPT) is not consistently implemented nationwide. Between July 2015 and June 2016, nationally reported IPT enrollment was 8,093, while at the same time, the CTB sub grantees, which focus on just 13 of the 64 districts in Bangladesh, (plus specific support to diabetic hospitals nationwide), enrolled 76 percent of the people receiving IPT.

### *Diagnosis Strengthening*

CTB also addressed the critical component of multi-drug resistant TB (MDR-TB) diagnosis and treatment by improving the functionality of the GeneXpert network. After a country-wide inventory and significant efforts jointly with NTP and Cepheid, 38 of the 39 machines (97%) are now working, compared to 29 machines (74%) when CTB began. CTB support has decreased the number of modules not working by over 40% in calendar 2016. Another key achievement was the advocacy by CTB with Cepheid to set up a repair and maintenance

center in Bangladesh, which will open in in 2016, and will significantly improve the machine repair time.

### *Public-Private Mix*

As part of the government's increasing role in better managing TB, CTB helped the NTP develop a new Public Private Mix Strategic Plan (PPM SP) involving all relevant stakeholders and supported by an external consultant agency. The strategic plan is a 4-year framework aligned with the NTP's National Strategic Plan for TB for 2016-2020 and will guide the NTP in strengthening and expanding the engagement of private sector providers, selected public institutions, NGOs, etc., to reduce the 47 percent gap in case detection, sustain treatment success of 90 percent (drug susceptible), increase access to diagnosis for and reduce the incidence of MDR-TB.

The most crucial achievements of CTB Bangladesh's APA2 period are spread across the project's major technical areas:

- Detected 896 MDR-TB cases in 2015; 880 MDR-TB cases were enrolled in treatment in 2015.
- 39,768 TB cases were detected between July 2015 and June 2016.
- Improved adherence of MDR-TB DOT providers and ensured 97% of DOT by providing incentives and establishing an intensive monitoring system through mHealth along with the extensive supervision of field based CTB staff.
- Increased patient adherence to the treatment and the success rate among MDR-TB patients reached 73%, in part through CTB's provision of nutritional support and investigation cost
- Increased pediatric TB case finding – CTB supported finding over 5,600 of the 6,500 pediatric patients nationwide.
- Developed a national PPM Strategic Plan and helped create a second edition of "Guidelines on Public-Private Mix for Tuberculosis Control."
- Developed the Laboratory National Strategic Plan, the first step towards an accreditation system.
- Improved the functionality of the GeneXpert network by conducting a country-wide inventory of the operational status of the 39 GeneXpert machines. In collaboration with NTP and Cepheid, steps were taken to ensure that all machines received the necessary maintenance, calibrations and modules upgrades to ensure operations and routine testing. To date 38 of 39 machines are now up and running, versus 29 at the start of CTB. By supporting this activity CTB improving testing capacity by 40%.
- Improved staff safety at lab facilities by ensuring the certification of 12 biosafety cabinets.
- Initiated active case finding among industry workers using a right based approach based on workers' and (TB) patients' rights as defined by the Bangladeshi labor laws.
- Helped develop a new infection prevention and control curriculum and taught trainers how to develop a functional Infection Control Plan to prevent TB among HCWs and patients.
- Implemented an NTP-endorsed contact investigation mechanism including SOPs and updated recording and reporting formats; this will increase MDR-TB, DS-TB and pediatric TB case detection.

- CTB and NTP developed a more effective, user-friendly, short “History Taking Tool,” printed copies for distribution and handed over ownership to NTP.
- CTB-revitalized the Advocacy, Communications, and Social Mobilization (ACSM) committee and working group and had it formally endorsed by DGHS. This committee will guide the coordinated implementation of the IEC/ACSM Strategy of NTP and partners.
- Helped develop the NTP’s new HRD Plan, to ensure adequate numbers of health workers at different levels of the health system are motivated and professionally competent, and can successfully implement and sustain comprehensive TB care and prevention services, based on the End TB strategy.
- Finalized the M&E Framework for NTP.
- Formulated Data Quality Assurance (DQA) tools and system.

## 2. Introduction

According to the 2015 the World Health Organization's TB Global Report, Bangladesh, a country with a population of 159 million, has a prevalence rate of 404/100,000 population (includes HIV+TB) and an incidence rate of 227/100,000 population. The proportion of MDR-TB among total pulmonary cases is 1.4% for new cases and 29% for previously treated cases. An estimated 20% of the MDR-TB cases were detected last year and the overall estimated case detection rate is only 53%. The Government of Bangladesh (GOB) aims to increase case notification from 53% to 75% by 2021, with a 2017 target of 217,000 cases notified (CNR 134/100.000), up from 196,717 cases notified in 2014 (CNR 124/100,000). (Source: approved PMP).

CTB is one of the main global mechanisms for implementing USAID's TB strategy. In Bangladesh, this project was implemented by MSH and KNCV during APA2; in August 2016, Interactive Research and Development (IRD) was designated as a technical lead from APA3 onwards. CTB's goal in Bangladesh is to reduce morbidity, mortality, and transmission until TB is no longer a public health concern. CTB is a technical assistance project, providing support to the NTP to strengthen its capacity in terms of planning, implementation, coordination, supervision, monitoring, and recording and reporting of the TB program in Bangladesh. The overall project objectives and sub-objectives are directly aligned with the United States Government's (USG) Global TB Strategy 2015-2019. The selected technical strategy, priorities and project activities for CTB-Bangladesh are evidence-based, drawing from numerous key resources, including WHO's End TB Strategy, NTP's National Strategic Plan, the latest Joint Monitoring Mission (JMM) and the USAID/Bangladesh Country Development Cooperation Strategy (CDCS).

CTB particularly addresses objective 7.6 of the Strategic Investment Plan (SIP) for the 4th Bangladesh HNP Sector program, which aims to reduce mortality and morbidity from communicable diseases by reducing risk factors for TB transmission and strengthening health service delivery options for early detection and management. The project provides significant technical assistance to strengthen early TB detection, TB case management and contributes to TB prevention through active case finding and strengthened contact investigation of all TB and MDR-TB patients and provision of Isoniazid Preventive Therapy to reduce transmission in the community.

CTB, in collaboration with USAID, NTP, and local partners has identified key priority areas for APA3 that will be addressed through the activities in the APA3 work-plan under three main objectives:

- Objective 1: Improved access to quality patient-centered care for TB, TB/HIV, and MDR-TB services (quality of care)
- Objective 2: Prevention of transmission and disease progression (case finding-all kinds)
- Objective 3: Strengthen TB platform- (leadership, Financing-M&E, Research)

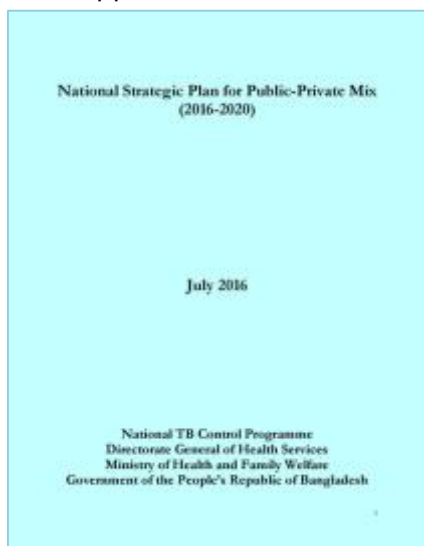
CTB is implementing its activities at field through eight sub-awardees:

- Bangladesh Pediatric Association (BPA)
- Bangladesh Diabetes Association (BADAS)
- Centre for Woman and Child Health (CWCH)
- Damien Foundation Bangladesh
- Health Education, Environment and Development (HEED) Bangladesh
- World Mission Prayer League (LAMB)
- Nari Maitree
- Rangpur Dinajpur Rural Service (RDRS)

### **3. Country Achievements by Objective/Sub-Objective**

#### **Objective 1. Improved Access**

CTB supported NTP with the development of a new PPM Strategic Plan (PPM SP) involving all relevant stakeholders and supported by an external consultant agency. The developed strategic plan is a 4-year framework aligned with the NTP's National Strategic Plan for TB for 2016-2020. The PPM SP was developed to guide NTP in better engaging private sector providers, selected public institutions, NGOs, corporate sectors, and professional associations and bodies to reduce the 47 percent gap in case detection, sustain treatment success of 90 percent (drug susceptible), increase access to diagnosis and reduce the incidence of MDR-TB. Following developed PPM SP, NTP expanded different PPM models and approaches in the country.



While developing the PPM SP, the project also contributed to WHO's finalized second edition of "Guidelines on Public-Private Mix for Tuberculosis Control" and helped flesh out the model to expand the Village Doctor model of care beyond the Damien Foundation intervention area.

CTB also assisted NTP to re-structure National PPM committee and PPM working group and form a Mandatory Notification Task force.

The government of Bangladesh declared TB as a notifiable disease in January, 2014, making it mandatory for all public and private health providers to notify the NTP of all cases. However, the tools and system for mandatory notification have not yet been developed. In APA2, CTB supported NTP in adding mandatory notification to the list of priorities, helped form a mandatory notification task force, and created an operational plan. A survey was done by ICDDR,B in selected areas to document the behavior and practices of both providers and patients towards mandatory notification. While mandatory notification of treatment outcomes is not included in the gazette, CTB will advocate for this as part of the system developed.

CTB planned to pilot a mandatory notification system in APA2, but was unable to bring in the support from IRD, due to visa issues. IRD was to assess the potential model or system

expansion for mandatory notification and designing and piloting that system in selected parts of Bangladesh. CTB modified the plan and engaged ICDDR,B for the survey. Therefore, we were unable to pilot this system in APA2, as was planned.

The survey among private doctors (GPs) revealed that each year the survey recipients on average diagnose 24 and 48 patients, for GPs and specialists respectively, so clearly the GPs are a significant contributor to finding TB patients. About 63% of the interviewed private doctors are aware of the declaration of mandatory notification by the GoB but the majority do not notify patients to NTP, so a large number of private patients are missed in national statistics and do not receive free high-quality TB medicine. It is now of utmost urgency to implement the mandatory notification system which has been declared by GOB and will be a priority for CTB to support in APA3

The key recommendations made by the private physicians are: a) simple notification form (electronic or paper) which should not take much time to fill in; b) preferred tool for notification is electronic, followed by mobile text, smart phone application, and web mail. Also suggested that mobile texting should be toll free and smartphone and web portal should be interlinked; c) where there is no internet connectivity, provide a printed referral form and an NTP- supported health worker to assist; d) support from NTP for the practitioners in building awareness; e) maintain confidentiality of the patient data.

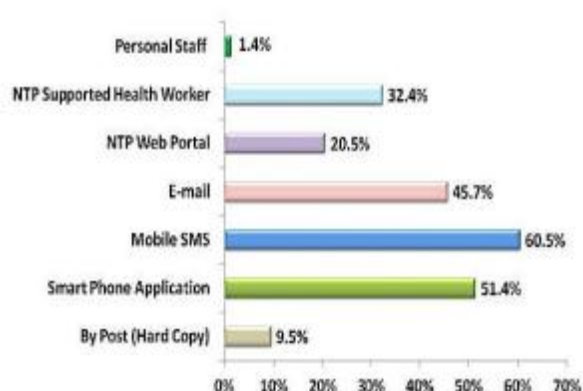


Figure 1: Provider preferences for mandatory notification

With CTB support, NTP will formulate a user-friendly system of notification next year and implement it in selected parts of Dhaka city.

The International Standards of TB Care (ISTC) have been adopted by NTP, Bangladesh but have not yet been disseminated. In APA 2, CTB assisted NTP to develop a one-pager on the most appropriate and applicable ISTC for the country. The standards were adopted through the PPM working group and endorsed by NTP.

To start engaging private pharmacies in Directly Observed Treatment, short course (DOTS) in urban areas, CTB conducted a consultation workshop with pharmacy associations, designed a pharmacy training module, and formulated a plan for training and engagement. The project provided support to develop a training module for the informal providers. This achievement is expected to help the NTP partners use uniform training materials for this group of providers in the country.

## IR1.2 Demand side: Community empowered, especially among risk groups

To strengthen advocacy, communication, and social mobilization (ACSM) approaches countrywide, CTB supported NTP to develop an ACSM Strategic Plan in collaboration with the key partners. Since it is important to have a common platform to plan, implement, and

monitor activities and document best practices for all partners of NTP through a patient-centered care model, CTB and NTP revitalized the ASCM working group and committee's organizational framework and ToRs. Workshop participants developed patient-centered TB preventive and treatment activities.

CTB worked on a patient charter on TB control and prevention to serve two purposes: First, for TB patients during initial and follow-up visits with the facility-based health care provider, and second, for health care workers to demonstrate the TB patient's rights and responsibilities in seeking TB diagnosis and treatment. CTB developed a draft version of a patient centered counseling job aid for DS and MDR-TB with right based approach, new relevant END TB messages (children, workers, IC), and training curriculum for facilitators and DOT providers, all in Bangla and English. This counseling job aid will be used for patient education, specifically to improve treatment adherence. One baseline assignment will be tested in two districts before introducing the guide and an impact evaluation will be conducted after one year. An industry engagement video about patient and workers' rights and treatment adherence was also developed.

### **IR1.3 Provider side: Patient centered approach integrated into routine TB services for all care providers for a supportive environment**

CTB crafted messages and developed job aids for TB/Diabetes Mellitus (TB/DM) with support of STTA, which will be distributed among the sub grantees' DOTS clinics along with the one of the tertiary level diabetic hospitals and some of their affiliated centers. This job aid will be used during the patient counseling sessions.

Table 1. Case finding targets and results

#	Outcome Indicators	Baseline (Year/ timeframe)	Target	Result
			Y2	Y2
3.1.1	Number and percent of cases notified by setting and/or population and/or case finding approach	191,166 (NTP data 2014)	210,500 (Calendar year 2015)	206,915 (Jan-Dec 2015)
3.2.1	Percent of TB cases successfully treated (all forms)	94% (NTP data 2014)	94% (Calendar year 2015)	94.32% (100,658/106,721) (Jan-Dec 2015)

## **Sub-objective 2. Comprehensive, high quality diagnostics**

### **IR2.1 Access to quality TB diagnosis ensured**

CTB developed the detailed budget of the lab strategic plan in APA2 and shared with the NTP and all partners. Also, CTB finalized and disseminated the costed TB Laboratory Strategic Plan among all partners and national TB laboratory working group, and will print it upon receiving NTP's final approval. The NTP and other concerned parties have started using this plan to mobilize resources to meet the 5- 5-year TB laboratory targets.

An inventory mapping of the lab network was one of the requirements for accreditation of the TB microscopy network. CTB developed the necessary tools to evaluate the network microscopy labs for data recording and reporting, infrastructure and biosafety, human resource, workload and performance, equipment, supplies, participation in EQA, availability of regulatory documentation. The tool was shared with the national TB Laboratory working group, and mapping will be done in APA3. As a result of this assessment an operational plan will be developed to implement improvements to the Microscopy Network and its services. This plan will guide strategic planning by NTP and provide a platform for the delegation the tasks among the relevant partners.

The CTB project budgeted support for the maintenance of LED FM/ light microscope to ensure the functionality. However, there was an internal plan to encourage national ownership for routine maintenance support of these microscopes. The project worked closely with NTP to secure a budget from Global Fund for the servicing / maintenance of all LED FM/ light microscopes. The NTP also plans to incorporate these maintenance costs in the operational plan of GOB. CTB successfully transitioned this activity to NTP in APA2.

Forty-eight laboratory staff (34 Male/ 14 Female) received refresher training for light microscopy. The training reshaped knowledge and skills, and should help to improve performance and the quality of smear examinations. Staff reviewed the basic elements of microscopy from ZN staining, slide examination, reporting, supervision, and quality control. Overall, this training helped improve the quality of ZN microscopy for each respective laboratory that participated, as assessed through onsite supervision and blinded rechecking. As we provided training only for 48 participants, lab coordinators assess their performance during their routine supervision.



Practical work of participants on Basic LED –FM training at NTRL from April 16- 21, 2016

Expanding the light emitting diode (LED) network to diagnose more TB cases at peripheral level is an important priority of NTP. CTB trained 48 laboratory staff (36 M/ 12 F) to expand the LED microscopy network in line with the national strategic plan; 25 additional microscopes will become operational during APA3. The training should improve microscopy services at the participating sites and thus increase patient diagnosis for TB. In addition, CTB developed a job aid, which will be distributed to all microscopy laboratories performing LED fluorescent AFB examinations in Q1 of APA3. This job aid will provide guidance for quality auramine smear preparation and examination.

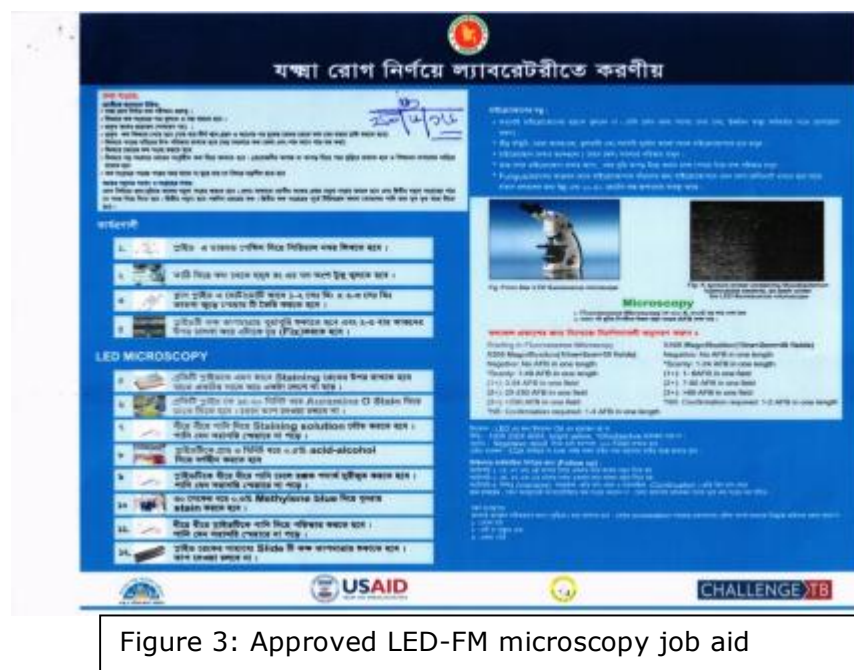


Figure 3: Approved LED-FM microscopy job aid

NTP took initiatives with the Ministry of Health and Family Welfare (MoHFW) to secure funding for customs clearance of the Sylhet containerized lab under the technical supervision of the CTB lab technical officer. The NTP successfully received funding from the Central Medical Stores Department. In June, as soon as the budget was secured, the lab was shipped from South Africa to Bangladesh. Having completed the customs clearance process, it was transported to the site, Sylhet. The containers were placed over pylons at the site on September 29, 2016. However, establishing of the electrical substation is still pending – through GoB funding – and the lab will be operationalized as soon as the electric power substation has been established.

CTB provided technical support to form a national TB laboratory working group and supported NTP to conduct three meetings of the group. This group has clear ToR and act as an important platform to strengthen the TB laboratory network and contributes in key areas such as forecasting and procurement of required laboratory supplies and equipment, review and endorsement necessary laboratory guidelines, documents, and management of the supply chain to ensure uninterrupted services.

## **IR2.2 EQA network for lab diagnostics & services functioning**

In APA2, CTB conducted external quality assessment training (EQA) for 83 (59 M/23 F) participants, which included one batch carried over from APA1. The training significantly improved the ability of the EQA centers to perform their activity in line with the national SOP, per pretest and posttest results. There are several steps needed to improve the EQA systems beyond the training that we have done. For example, NTP policy mandates only 60 slides will be taken per lab /year, whereas statistical analysis shows this number should be 100 slides per lab/year. Low retention of trained human resource, very few EQA centers (40 for over 1100 labs), high workload of staff, fear of the EQA staff losing job etc. are the factors hindering the adequate progress of the network. Unfortunately, the RTRLs are still not enrolled in the EQA system, due to bureaucratic / administrative challenges between the NTP and the RTRLs, which report through a different line in the MOHFW. CTB is working to resolve this issue and enroll the RTRLs in EQA.

Also, the follow-up smear examination positivity rate has been increasing in some centers (as high as 13.6% from the national baseline of 4%) and the quality of supervision is also improving. The overall follow-up positivity rate has slightly increased in 2015 (4.3%) compared with 2014 (4.2%). Still, the number of High False Negatives (HFN) and High False Positives (HFP) has remained the same so far, but data is not yet available following our training (through Sept 2016), as the NTP Annual Report includes data through December 2015. Some major barriers persist at the field level due to some policy related issues about EQA. CTB is working with NTP and relevant partners to solve those issues.

CTB arranged and provided technical guidance to conduct 20 supervision visits to microscopy centers with trained EQA staff. The project mentored supervisors on the correct way to identify the gaps and resolve issues during onsite visits, provide feedback with corrective actions in order to correct deficiencies, and motivate staff in order to drive overall improvement in the quality of EQA support provided to the microscopy network. Many problems at the peripheral labs were solved through these supportive supervision activities while mentoring EQA supervisors to perform their assessment duties



CTB Laboratory Advisor facilitating session on the 'Training on EQA for TB Laboratories', Dhaka



Joint supervision visit at RTRL Chittagong, March, 2016

### **IR2.3 Access to quality culture/DST ensured**

Four microbiologists were recruited, 3 of them are embedded in NTRL and RTRLs and one is supporting the project activities at the central level. Since the deployment of microbiologists, they have been instrumental to provide support for NTRL and RTRLs and improve the quality of the lab and diagnosis TB and DR cases. These are not new positions, but a continuation of USAID support to the NTRL and RTRLs. The government budget does not include the positions required to run the laboratory smoothly. Three laboratory coordinators provide support to quality implementation of lab activities and the provision of technical assistance to GOB staff.

CTB provided the technical support to NTP to inventory the equipment available at NTRL and RTRLs through support of the lab technical working group and staff at the NTRL and RTRLs to help ensure timely maintenance support. However, a more robust and comprehensive laboratory information management system (LIMS) is planned in APA3. This support helped to operationalize liquid TB culture and DST via MGIT 960 at Chittagong. Support was also provided for routine maintenance and calibration to ensure continuous operation of selected equipment. Maintenance support to MGIT is provided by the GOB through the Global Fund grants.

Ten sturdy transport boxes were provided to the NTRL and RTRLs to support the safe transport of samples. Supervision by NTRL to RTRLs has been established; however it needs to be further strengthened. The Khulna RTRL started routine cultures and is planning for DST under the guidance of NTRL in APA3. Two joint supervision visits were conducted for the RTRL at Chittagong and Khulna as planned. This supervision guided the respective RTRLs to improve reporting system, document the quality indicators and analyze those periodically for corrective measures and establish IQC system.

Quantification, forecasting, and procurement of lab reagents and supplies for NTRLs/RTRLs was successfully delegated to the National TB Laboratory working group by NTP. The

National TB Laboratory working group is functioning well, meet regularly, and conduct timely forecasting and procure lab reagents & supplies for NRTL/RTRLs. Lab experts from the program and representatives from the NRTL/RTRLs share the information and do the forecasting during lab working meeting,.

#### **IR2.4 Access, operation and utilization of rapid diagnostics (i.e. Xpert) ensured for priority populations**

##### **Activity 1: Ensure maintenance and calibration for GeneXperts**

There are 39 GeneXpert machines under the National TB Control Program of Bangladesh. In APA2 as needed, CTB replaced 55 modules:

Site	# Modules	Site	# Modules
NTRL	1	RTRL Chittagong	13
Gazipur	3	Netrokona	1
BIRDEM	3	Noakhali	4
Bogra	4	Pabna	2
Rajshahi	4	Jessore	4
Gopalganj	3	Khulna	3
Rangamati	4	Kishoregonj	2
Mymensingh	4		

Through the support of CTB, the number of functional modules (158 in January, 2016 to 186 in September, 2016) and fully operational machines (33 to 38) increased. CTB functionalized 11 GeneXpert machines located at CDC Comilla, CDH Faridpur, BSMMU, CDC Noakhali, CDC Rajshahi, CDC Gopalganj, CDC khulna, CDC Jessore, CDC Bogra, CDC Pabna, DF Hospital Mymensingh. Regular maintenance support is being provided by Cepheid's local agency under the technical direction of CTB. All needed 26 warranties were renewed, including Xpert check assay kits. CTB facilitated the repair of UPS at GeneXpert sites as needed.



CTB Laboratory advisor replacing modules with Cepheid local agency at CDC Jessore

The maintenance support CTB provides has become not only a life line to keep the GeneXpert network running, but also has greatly impacted TB and MDR-TB diagnosis, as shown below. There were 39,452 tests conducted in APA1. Of these, 14,443 MTB detected and 936 RR TB were detected. In APA2, there were 45,288 tests conducted. Of these, 17,501 MTB detected and 966 RR TB were detected. GeneXpert utilization (>15%), MTB (> 21%) and RR-TB (>3%) case detection all increased due to the intense support of CTB. It is not clear why the number of presumptive cases decreased in Q3 of APA2.

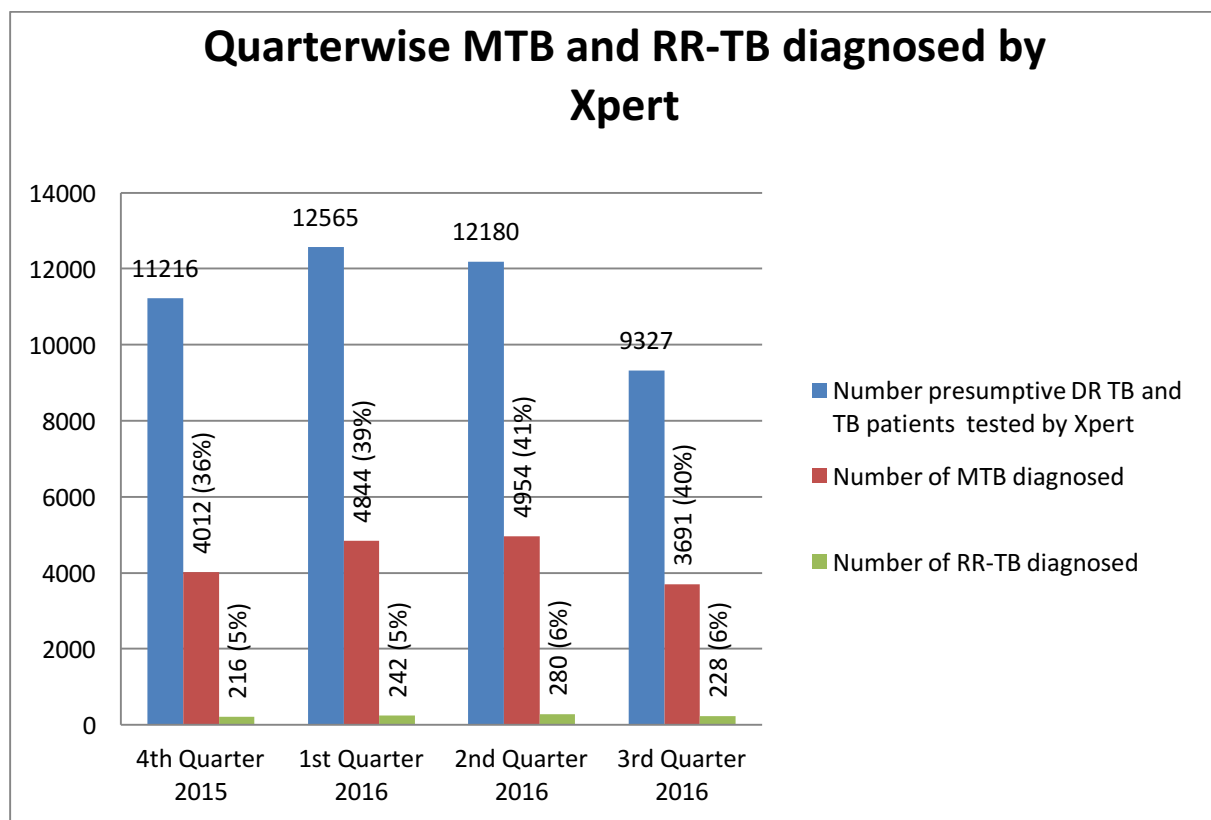
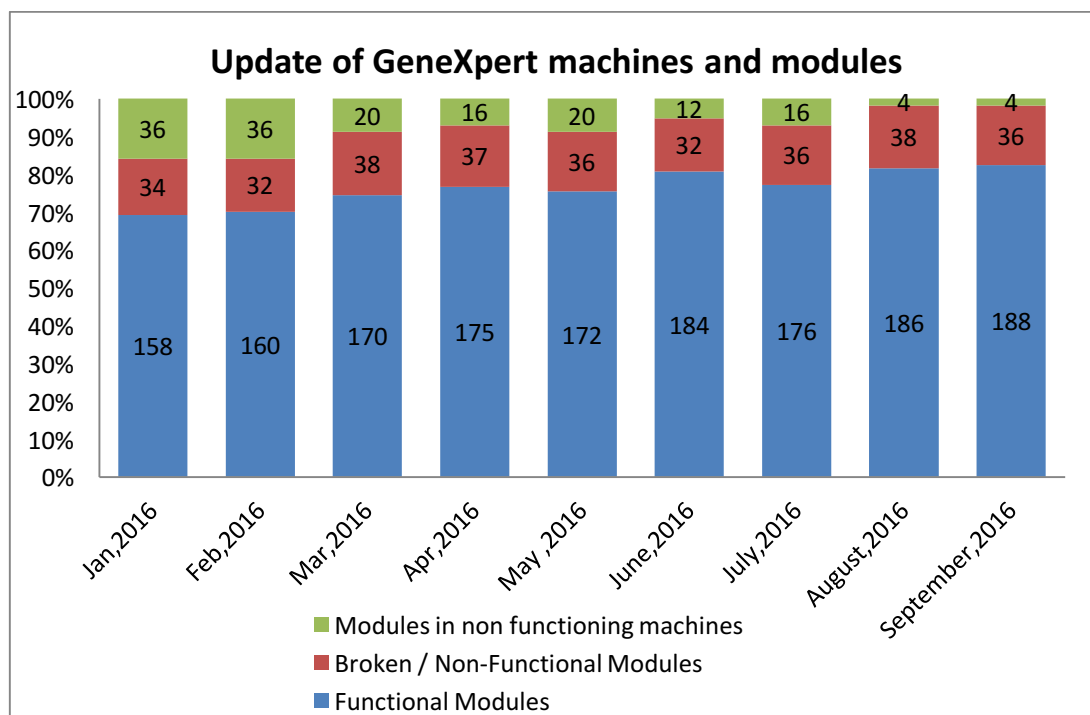


Figure 4: MTB and RR-TB diagnosis by GeneXpert (October 2015 to September 2016)

Although CTB has increased the number of functional modules this year, the utilization of GeneXpert machines remains very low (on average less than one test per module per day, vs. a reasonable workload of 2-3 tests per module per day). The probable reasons for this could be, 1) weak tracking mechanism to identify and refer all presumptive MDR-TB/ TB cases, 2) inadequate supervision and monitoring, 3) geographical inaccessibility and limitations within the specimen transport systems, 4) the unwillingness of patients to travel due to cost or loss of income due to a missed day of work, 5) insufficient staffing or no back up staff for some of the GeneXpert laboratories when staff are on leave, 6) weak history taking mechanism and knowledge gap, 7) and unwillingness to collect and transport sputum samples. CTB periodically analyzed the utilization rate and shared this gap with NTP and implementing partners through meetings and workshops to stimulate awareness and attempt to drive a greater case referral. In APA3, CTB will continue to work closely with the NTP and major implementing partners to take robust measures to improve the utilization of this rapid diagnostic technology in order to identify cases earlier and faster.



CTB organized a semi-annual performance review workshop on March 31, 2016, with participants from 19 GeneXpert laboratories and program staff from the regional and central level. There were 55 participants (41 male, 14 female) in attendance. Data of GeneXpert centers were analyzed and feedback was given to improve the utilization. Also, GeneXpert staff learned basic maintenance skills to help them to minimize errors and perform some minor troubleshooting activities. As a result, some GeneXpert center managers were motivated to run more cycles of tests to cope with the daily workload.

CTB provided technical input to customize the GeneXpert training manual in line with the updated training module of Cepheid and GII package. This module has been using to train the staff of GeneXpert centers on routine operation, basic maintenance and troubleshooting. Two participants (one from NTP and one from CTB) participated in the Cepheid GeneXpert training course February 22–29, 2016, in Toulouse, France. These individuals are presently contributing to the routine maintenance of GeneXpert machines and ongoing training activities. The CTB Lab Advisor provided technical support to train 98 (85 M/ 13 F) participants on GeneXpert MTB/RIF technology in collaboration with NTP at the NTRL.

CTB conducted a landscape analysis of the GeneXpert network and sites to accelerate the procurement and lower the price of GxAlert software, which connects GeneXperts into a network system that notifies the central-level manager of machine or operational issues in real-time, in APA2. The installation of GxAlert is scheduled in November, 2016. CTB developed a GeneXpert monitoring tool kit and draft the national implementation plan for further expansion via CTB field staff were oriented on the monitoring checklists and field testing assessments that will be started in APA3. Routine supervision to GeneXpert sites by

the CTB laboratory adviser and program continue to strengthen GeneXpert maintenance and services as needed.

Lab working group meeting



### **IR2.5 Laboratory Quality Management System initiated**

Previously, reports were sent via courier with lack of coordination with field staff, which caused long delays of up to 10 days with frequent loss of reports. To remedy this, CTB developed a mechanism for sending an electronic copy immediately followed by the courier, for more timely delivery. Under this new mechanism a decreased in the delay of reports (now only 1 day) with no lost reports observed. This new mechanism was accepted by the National TB Laboratory working group which will take over this activity. The report is emailed to CTB divisional, district and lab coordinators to reduce the delay and coordinate with the patients or referring health facilities. NTP thinks it is not an issue of confidentiality as copy of DR –patient’s treatment card (mentioning all lab results) is shared by NTP with key program personnel at the community/facility level to ensure best care and prevent attrition.

The CTB Bangladesh project assessed the TB microscopy network and developed and shared with the NTP a plan (activities and costs) for stepwise accreditation of TB microscopy laboratory network. This plan will be used in APA3 to perform the further steps for accrediting the TB microscopy network.

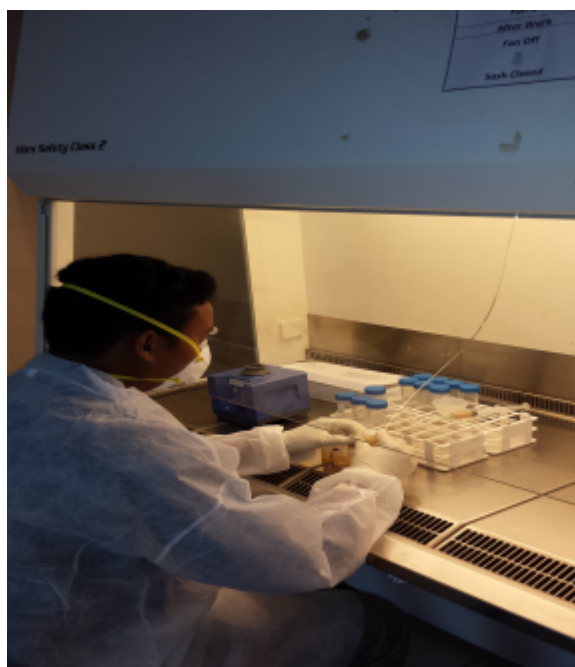
### **IR2.6 Expedient laboratory specimen transport and results feedback system operational**

In APA2, CTB organized orientation on sputum transportation SOP for 54 participants of NTP and partners (M-43, F-11) in Dhaka and Khulna. This orientation taught the field level staff how to properly ferry samples to the nearest GeneXpert sites and NTRL/RTRLs. CTB pays the courier fee for sample transportation as needed. In APA2, 3,104 samples (APA2 target

was 4,000) were transported to NTRL, Dhaka, and RTRL, Chittagong for follow up culture and GeneXpert testing. Of those, 857 samples underwent GeneXpert testing; of these 331 (39%) TB and 31 (9%) MDR-TB cases were diagnosed. Overall, sputum transportation accounted for 2% of overall GeneXpert testing; this will increase in APA3 as BRAC expands their pilot of sputum transport and CTB-supported areas implement for a full year.

### **IR2.7 Bio-safety measures in laboratories ensured**

Biological Safety Cabinets (BSCs) are the primary containment devices that protect the laboratory workers, products, and environment from exposure to microbiological agents and must be certified annually after installation by a qualified technician. This was not the case with the cabinets at different NTP laboratories because there were no qualified technicians in the country. CTB was requested to support BSC certifications as this was an unsafe situation for the laboratory staff and environment. CTB contracted a South African company (AFMS) to certify the BSCs and HVAC system. Now 12 of the 14 BSCs are certified and safe to operate – seven at NTRL (Dhaka), two at Rajshahi RTRL, one at Netrokona DF hospital, one at Chittagong RTRL, one at Khulna RTRL, and the HVAC system of NTRL, Dhaka. Two BSCs of RTRL at Chittagong did not pass the certification test and will need additional refurbishment. This support was gratefully acknowledged in the latest working group meeting.



Technologist working under certified BSC at NTRL

The Effluent Decontamination System (EDS) has been incorporated into the containerized lab. The EDS plant has been shipped and customs clearances are under process. The containerized lab was shipped on June 19, 2016, from South Africa and cleared customs on September 22, 2016. The lab was transported to Sylhet on the same day and arrived on September 24, 2016, at the Sylhet site. All three containers were placed on pylons by at the site on September 29, 2016.



Containerized lab in position in Sylhet

#	Outcome Indicators	Baseline (Year/ timeframe)	Target	Result
			Y2	Y2
2.2.2	Number and percent of laboratories showing adequate performance in external quality assurance for smear microscopy	1,038 / 1,106	1,048 (as per PMP)	1106 (source: NTP annual report 2016)
		94%	95%	100% (source: NTP annual report 2016)
2.2.3	Number and percent of laboratories enrolled in EQA for culture/DST	1	3	1
		33%	100%	33%
2.3.1	Percent of confirmed TB cases who undergo DST and receive their results	New: 2.8%	5%	1,828 / 36,836 (5%)
		Retreatment: 8%	60%	23220 / 36,836 (63%)
		3%	9.4%	11,788 / 36,836 (32%)

### Sub-objective 3. Patient-centered care and treatment

#### IR3.1 Ensured intensified case finding for all risk groups by all care providers

The TB control program in Bangladesh is implementing a program through GO and NGO collaboration under leadership of NTP. The NGOs are primarily responsible for the community level screenings and suspect identification which are the first two steps in the TB diagnosis. The NGOs are also responsible for providing DOTS to the patients, counseling patients on treatment adherence, and conducting awareness and social mobilization activities. Nationwide, 42 NGOs provide DOT on behalf of the NTP. CTB's grants cover

specific underserved areas, and from July 2015 – June 2016 found and treated 32,056 of the 214,854 (15%) TB patients.

Currently, the project has been supporting eight different sub-grants with local NGOs to implement community based TB control activities particularly in underperforming districts and targeted to populations living in urban slums and inaccessible rural areas. Among the sub-grants: six local NGOs, one professional body (Bangladesh Pediatric Association) and one trust based organization (CWCH), who has supplemented NTPs program in the community level under the banner of CTB. The NGOs implemented their community based TB control activities particularly in underperforming areas and targeted high risk populations (such as diabetics and workers in specific industries, such as tea and rubber gardens), urban slums, and also covered some hard to reach areas. All the sub-grantees started their activities from July, 2015; a glimpse of their activities and performance are discussed below. The sub awardees have several implementing strategies to find and refer TB patients. They have semi active case finding method to identify the TB symptomatic from the community settings and raised awareness. As a result of these activities TB symptomatics refer from the different sources. Recently they have introduced contact investigation activities as a method of active case finding. Through this special intervention many more TB symptomatic have been identified and referred, as noted under IR4.1.

Table 4: Case Notification by NGO Sub-grantees

	<b>Bacteriologically Positive (Smear +)</b>	<b>Clinically Diagnosed TB cases</b>	<b>Extra-Pulmonary TB Cases</b>	<b>All forms</b>
<b>Oct 15- Dec15</b>	4,316	1,436	1,914	<b>7,666</b>
<b>Jan16- Mar 16</b>	4,495	1,429	2,169	<b>8,093</b>
<b>Apr 16- Jun16</b>	4,889	1,726	2,326	<b>8,941</b>
<b>July 16- Sep 16</b>	4,554	1,387	1,771	<b>7,712</b>
<b>Total</b>	22,201 (56%)	7,370 (19%)	10,197 (26%)	<b>39,768</b>

From 8 sub awardees of CTB, Nari Maitree focuses purely on urban slums, some other NGOs are covering high risk group and vulnerable populations; for example, BADAS works with diabetics and HEED is covering the tea garden, rubber garden populations. In APA2, 3.65% came from urban slum; 3.94% of the cases from TB-Diabetes and 6.25% cases came from tea garden-rubber garden populations. As the other grants cover varied populations (urban and rural, individuals from risk groups, etc.), and the NTP does not track urban vs. rural, we do not have that breakdown. However, the preliminary results from the TB prevalence survey indicate much higher incidence in urban areas.

There was an increase in case notifications in the second and the third quarter compared to the first, as early delays in funding, caused by the need to complete each organization's project registration with the NGO Affairs Bureau prior to disbursement, slowed initial activities and expenditures. During these periods the sub grantees were working with their full effort to minimize the gap and contribute additionally to the existing performance of NTP. But in the fourth quarter, the case identification declined compared to the previous quarters. This is because the fourth quarter represents the no cost extension period and the sub grantees performed minimal activities.

CTB was designed to integrate TB and diabetes services to expand TB screening, diagnosis and referral, particularly among high-risk groups. The project started to establish linkage between the existing diabetes health care services provided by one tertiary level hospital and other affiliated centers of BADAS and Bangladesh Institute of Health Science (BIHS). The existing National Guidelines were revised and different training and orientation to health professionals were conducted for proper referral and to find TB cases among the DM patients. Ninety-six data collectors were trained to ensure referral and recording of 17 affiliated centers and 63 local units of BADAS, as well as nine BIHS centers.

Table 5: Detection of TB among DM patients

Indicators	Achievements
DM Patients referred for sputum AFB microscopy test	10,643
DM patients diagnosed as bacteriologically confirmed TB	1,072
DM patients clinically diagnosed as pulmonary TB	288
DM patients diagnosed as EPTB case	206
Total number of DM patients diagnosed with TB	1,566 (15%)
DM-TB patients put on treatment (at BIRDEM)	1,566 (100%)
Number of DM patients received counseling on TB-Diabetes co-morbidities	16,270

BADAS tested 318 presumptive MDR-TB cases by GeneXpert, of which 27 (8%) were confirmed TB. Among the diabetic presumptive cases, 10 RR-TB cases were found. Of those, eight MDR-TB cases with DM are now on treatment.

Childhood Tuberculosis in Bangladesh is underdiagnosed nationally, ranging from 2.78% to 3.1% over the last four years. Underlying reasons include lack of clinical skills of physicians at Upazilla level and low awareness of grass root health care workers. Also, community level awareness on childhood tuberculosis in Bangladesh is very poor.

The Sylhet Division comprises four districts and 8 sub districts with a total population of just over 9.8 million people. Among them, the population of children under 15 is 3,667,810 (37%).

In Sylhet division the total number of TB case detected in 2015 (up to September) was 14,797. Of those, 739 (5.1%) were childhood tuberculosis cases, which is half of the expected 10% of adult TB cases.

To minimize the gap CTB recruited Bangladesh Paediatric Association (BPA) to provide clinical training to improve the capacity of the physicians at Upazilla level regarding the management of childhood tuberculosis at Sylhet. In this division under the BPA CTB project, 153 medical doctors were trained. Contact investigation of the index cases is one of the effective methods for the referral of TB symptomatic children from the community. As part of this contact investigation activity, BPA trained 1,235 HCWs in the Upazillas of Sylhet, Hobiganj, and Moulovibazar.

Table 6: Quarterly pediatric TB case notification in Sylhet Division:

Quarter	Total Case	Childhood TB	%
1st(Jan - March, 16)	3,179	126	3.96
2nd(April - June,16)	2,601	182	7.0
3rd(July -15 Sep, 16)	2,877	130	4.52
<b>Total</b>	<b>8,567</b>	<b>438</b>	<b>5.06</b>

- Note: data above representing CTB project period

CTB implemented INH prophylaxis to children under five years old under the guidance of NTP through the sub-grantees. In line with national guidelines, our sub-grantees performed contact investigations and IPT for the under-five contacts of the smear positive TB patients. A total of 6,179 eligible children were identified and 5,692 provided IPT in APA2 through the sub grantees under CTB. The enrollment of IPT is about 92% in the sub-grant supported areas, significantly higher than the national average. In Bangladesh, we do not have structural implementation cascade from contact investigation to implementation of IPT. CTB will work on harmonizing country-wide implementation strategy for IPT.

Another important part is also the different type of ACSM activities NGOs organize to mobilize parents and communities to be aware of children's TB and bring them to the clinic. The sub grantees, grass roots level NGOs, are using their sub awards to implement childhood TB activities among the most vulnerable populations, in urban slums, peri-urban areas, and rural areas (e.g., tea gardens).

Table 7: Quarterly status of INH prophylaxis initiation by the CTB sub grantees

	# of children eligible for IPT	# of children started IPT	% eligible children on IPT
Oct-Dec, 2015	1,404	1,336	95.2%
Jan-Mar, 2016	1,519	1,364	89.8%
Apr-Jun, 2016	1,710	1,559	91.2%
July-Sep, 2016	1,546	1,433	92.7%
Total Oct 2015-Sep 2016	6,179	5,692	92.1%

The national reporting and recording of IPT is still not up to date. During the period of July 2015 to June 2016, nationally reported IPT enrollment was 8,093 whereas the sub grantees reported to CTB 6,191--76% of the national contribution. From the very beginning, CTB provided technical assistance to NTP to strengthen the recording and reporting system of IPT.

Prisoners are considered to be a high risk group to develop TB. The only current case finding strategy in the prisons through NTP is passive case finding. CTB intends to create a sustainable TB model program for the prisoners. In this regards, ICDDR,B has been recruited as a sub grantee to create a test site in two selected prisons (Sylhet and Gazipur). This sub-award started July 16, 2016, and results are expected July 15, 2017.

TB control in workplaces is one of the emerging difficulties of the NTP. Worldwide, millions of workers are not reached with community-based TB control programs while they are at work during the day. One problem is the TB program often has no access to such workers. The workers are vulnerable to TB in crowded workplaces due to higher risk of infection from high concentrations of people. The prevalence of TB is therefore higher among the workers than general population (Hassan et al. 2005). On the other hand, the consequences of TB are missed work, work disruptions, and reduced productivity (WHO 2003 WHO 2004).

In collaboration with NTP, CTB started an active case finding initiative among industry. Training materials that will be finalized in APA3 were developed for use in other industrial areas and BILS.

CTB arranged one policy level meeting with the Ministry of Labour and Manpower to orient them about the importance of management and prevention of TB in the workplace and recruited a new grantee who will cover the unreached industrial areas. Following an advocacy workshop and two meetings, Industrial Park (BSCIC, Sylhet) formally engaged. A work plan was developed, ACF system put in place with local NTP and BRAC/HEED, and 74 TB supervisors (68 Male, 6 female) and four ambassadors (all male) trained. Now they have good communications with local NTP, other local partners and the DOTS corner representatives. They already started referring TB symptomatic patients from that industrial park and ensure DOTS after diagnosis. Though there are 5,000 workers in this industrial park, five suspected TB cases among these workers were found, with one confirmed and under treatment, during the last two quarters (April-September, 2016) of APA2.



Advocacy workshop and meetings to engage industrial areas in TB control efforts

CTB initiated advocacy meetings in Khulna with two industrial parks to follow the same initiative as Sylhet. A draft training curriculum was developed to use in other industrial areas and BILS.

### **IR 3.2 Access to quality treatment and care ensured for TB, MDR-TB and TB/HIV for all risk groups from all care providers**

NTP Bangladesh is still facing the challenge of low detection of MDR-TB compared to the estimated number of cases as of NTP projection in the PMDT Expansion Plan 2013-2017. According to latest WHO report (Global TB Report 2015) the MDR-TB burden in Bangladesh is 4,800. NTP projected to diagnose and enroll 1,900 cases in 2015 but only diagnosed 896 and enrolled 880 from Jan- Dec nationally. The low case notification is caused not only by limited well equipped functional diagnostic facilities, but also a gap in knowledge among health care providers in identifying and referral of presumptive cases. Insufficient counseling and history taking of TB patients before initiation of TB treatment, low performance of microscopy centers (specially for detection of non-converting patients due to poor follow up sputum microscopy), and lack of contact investigation are hidden areas for low identification and referral of presumptive cases to the diagnostic sites. In the first half of APA2, there were also GeneXpert cartridge shortage and module failure of several GeneXpert machines.

Ensuring that all health care providers refer presumptive MDR-TB cases to diagnostic sites is an important intervention to achieve the MDR-TB case detection target.

As part of CTB effort for increasing universal access of presumptive MDR-TB cases to designated diagnostic sites, CTB,B project provided support to NTP to conduct two batches of sensitization workshop involving TB managers from different administrative levels, partners, and representatives from workplaces, Medical Doctors from Railway/Port Hospitals, different institutions and professional Bodies. The workshop was conducted through deliberation of presentations by the NTP, partners and other institutions on current MDR-TB scenario, probable reasons behind development of MDR-TB, criteria of MDR-TB, and urgency of referral of presumptive cases to diagnostic sites for DST, attempt for contact screening and there was discussion on key constraints and challenges and recommendations with possible actions.

An MDR-TB Patient at initial stage of treatment, An MDR-TB patient receiving treatment at NIDCH, Mohakahli, Dhaka. The patient back to his working life after several months of treatment.



Two workshops were conducted in March 2016, with 38 (33 male, 5 female) and 41 (36 male, 5 female) attendees, and had active participation of invitees in discussion of possible interventions to increase referral of presumptive MDR-TB cases to diagnostic sites. The project field staff work in close collaboration with government's Divisional/District/ Upazilla managers and implementing partners to sensitize them for identification and referral of presumptive MDR-TB cases to diagnostic sites. As a result of CTB effort through sensitization workshop followed by intense sensitization of managers by CTB field colleagues, referral of presumptive MDR-TB cases increased as data shows that presumptive cases from eight Gene Xpert sites at Chittagong was 2,220 in April-June 2015 vs. 2,517 in April-June, 2016 in Chittagong division. The detection of Drug Sensitive (DS) TB and MDR-TB cases in 2015 was 585 and 40 in 2015 and 869 and 46 in 2016 respectively which shows increase of 49% for DS TB and 15% for MDR-TB.



CTB also developed and printed a job aid (Wall hanging) consisting easy message on nine criteria of MDR-TB presumptive cases to facilitate the health care providers to identify and send presumptive cases for GeneXpert test without delay. The job aid will be hung on the wall of the health care provider's room to remind them for referral of eligible presumptive cases for diagnosis.

The project organized a Workshop to evaluate existing history-taking tools and formulated an improved version of the TB Treatment History Taking Tool (Annex II) and 7,000 pads were printed and handed over to NTP Store for distribution throughout the country and are being used by TLCAs or assigned persons from partners before initiation of diagnosed TB Patients.



A Health staff member is filling up the "Previous TB Treatment History Taking" form at a health facility before starting of treatment.

With the aim to assess the impact on detection of MDR-TB Cases, NTP conducted a pilot study for testing of all smear positive diagnosed TB (Previously Treated and New) cases by GeneXpert at four selected districts (Gazipur, Netrokona, Chuadanga and Noakhali) for three months. After completion of the pilot period CTB, organized a workshop on June 12, 2016 to evaluate pilot results of the new policy for testing all smear positive TB cases at 4 Xpert sites. Results showed a low yield of 0.21% (3) RR+ve out of the tested presumptive DR new TB cases (1,415). 2% (14) RR+ve out 705 of were tested re-treatment TB cases.

<b>Type of Cases</b>	<b>Number of Sample tested</b>	<b>Detected RR (%)</b>
New cases	1,415	3 (0.21%)
Retreatment Cases	705	14 (2%)

The result from the pilot study cannot be used for adopting any change in presumptive criteria for referral to diagnostic sites as the quality of the samples was questionable. The GeneXpert sites were loaded with rich number of samples waited for testing in the pilot period as there was lack of human resource and hence many sample were not tested. In the workshop, the recommendation was taken by the NTP to continue the policy at new sites including some urban sites with better lab conditions and other resources to ensure that we get a valid result, as the previous samples had degraded, invalidating the results.

Community-based treatment program has proven to be a good option for proper treatment of MDR-TB, especially in rural areas, keeping the patients in their own community. This strategy facilitate adherence of the patients to treatment and encourages the patient to complete the long duration treatment with severe side effects.

The NTP Bangladesh initiated management of MDR-TB patients in programmatic approach since 2008 involving only NIDCH, a tertiary level specialized hospital for chest diseases with 130 beds assigned for MDR-TB Patients. The NTP policy was to hospitalize the enrolled patients till the end of the injectable period, averaging eight to nine months. This long hospital stay challenged NTP with enrolling and managing a large number of patients, resulting in many patients being placed on the waiting list. The policy of long hospital stays again threatened a high default rate. To overcome the challenges, NTP with support from other partners, expanded hospital facility to five additional sites (total bed capacity 268 except Damien Foundation hospitals) and adopted cPMDT strategy. The new strategy was implemented at four pilot districts from mid 2012 and gradually expanded to cover the whole country. Among the patients enrolled under 20-24 month regimen, the lost to follow-up (LTFU) rate was 27% among 107 enrolled patients in 2008 which declined to around 10% among 495 enrolled patients in 2013 (calendar year).

During the CTB tenure (since mid-2015) with efficient effort by the project in monitoring and supervision by the project field staff, the lost to follow up further reduced to 5% and treatment success rate sustained to 73% among 369 patients enrolled from Jan to June, 2014. Among the 369 enrolled patients during the cohort (Jan to June, 2014), CTB is providing social support package for 271 patients where LTFU was found 9.6% and treatment success rate was 77% respectively. The treatment success rate increased from 64% to 73% among enrolled patients in 2008 and 2013 respectably which shows Bangladesh is achieving the highest success rate compared to other high MDR-TB burden countries.

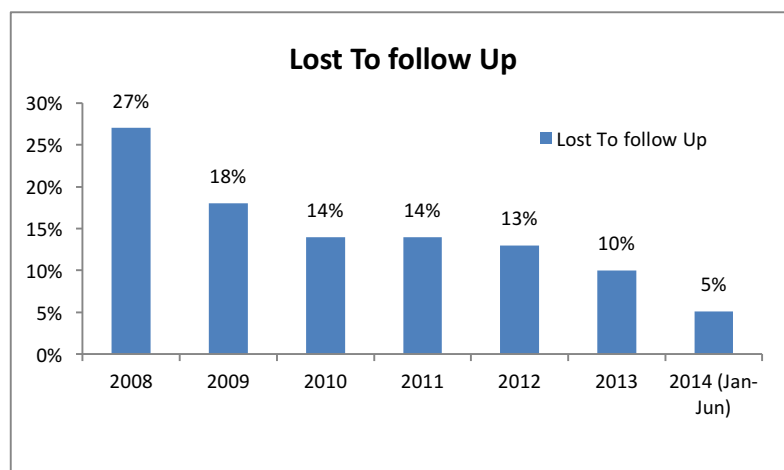


Figure 6: Decreasing trend of LTFU

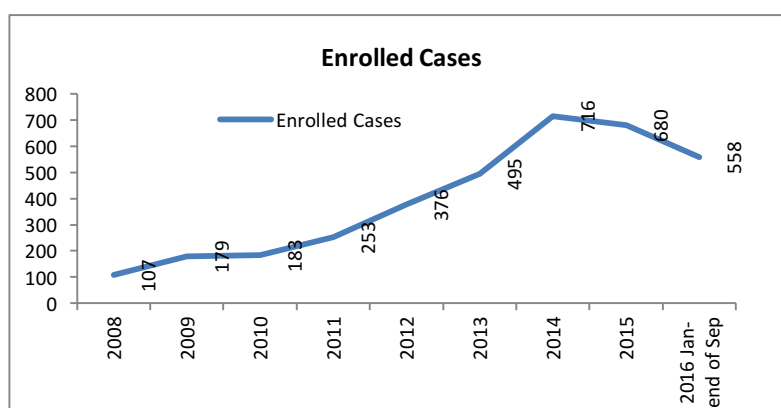


Figure 7: Number of yearly enrolled MDR-TB cases (data for 2016 is only nine months)

Under this new approach, the hospital stay has reduced from eight or nine months to one or two months. The early release of patients from hospital has helped to increase bed turnover rate and facilitated the program to initiate treatment for increased number of patients immediately after their diagnosis.

The policy allows early discharge and treatment continuation in the patients' own communities and helps to hold the patient under treatment for full course of treatment. Under this strategy, all Upazilla/DOTS Center based Out Patient MDR-TB Teams must be trained before discharge of patients from Hospitals or MDR-TB Treatment Initiation Centers. NTP policy calls for a working committee at each DOTS centers entitled "Out Patient MDR-TB Team" to provide comprehensive management of MDR-TB patients in the community.

This Upazila based outpatient MDR-TB team is primarily responsible for providing routine treatment including side effect management, and monitoring of the patients and MDR-TB DOT providers after patients discharge from hospitals.

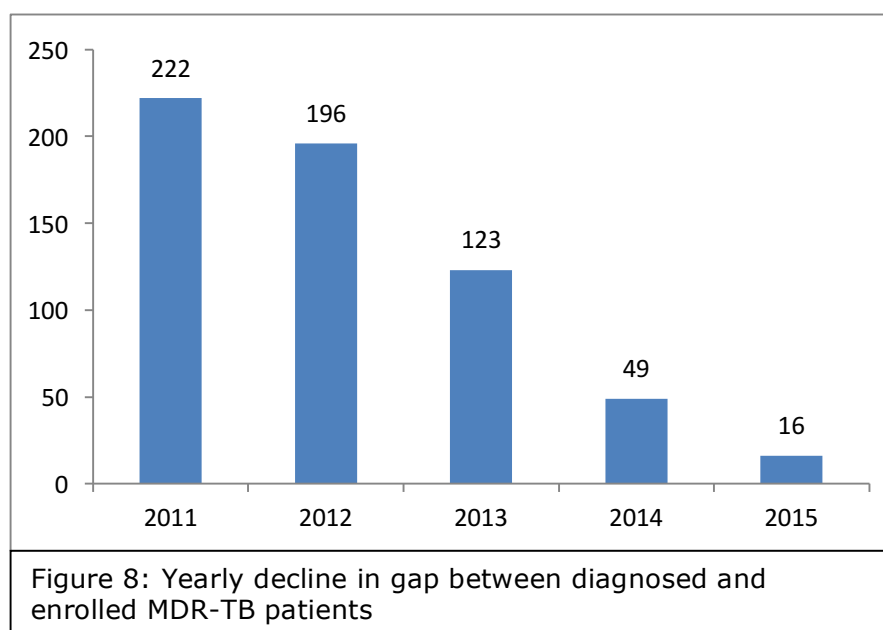
Availability of skilled health care providers at MDR-TB Treatment Initiation Centers and Upazilla level treatment centers is necessary to identify and refer presumptive MDR-TB cases and also for quality management of detected cases.

Raising identification and managing capacity among human resources at all levels (Central to grass root level) is the priority to cure detected cases and thus for declining the index cases in the community.

CTB is continuing the cPMDT approach. To develop capacity in management of MDR-TB cases in the field level, the project complemented NTP by organizing three days training on Community-based programmatic management of drug-resistant TB (cPMDT) for Upazilla based Out-patient MDR-TB teams of two districts, Khagrachori and Rangamati in APA2 covering eight and 10 upazillas respectively. A total of 126 participants were trained by the project (110 male, 16 female).

The training facilitated the Upazila Outpatient MDR-TB teams to implement their responsibility for providing routine treatment including side effect management, and monitoring of the patients and MDR-TB DOT providers.

The number of MDR-TB patients enrolled from October, 2015 to September, 2016 was 737 - an increase of 10% from the previous project period (October, 2014 to September, 2015) of 670. The gap between diagnosed and enrolled MDR-TB cases is decreasing steadily - CTB-supported cPMDT a likely contributor. About 222 diagnosed MDR-TB patients were not enrolled on treatment during 2011 but the gap came down to only 16 in 2015.



Maintaining DOT providers' commitment and effectiveness for better services to patients is a challenge. The project provides basic logistics (like umbrella, Medicine keeping box, bag, flash light etc.) to the MDR-TB DOT providers to comfortably perform their day to day DOT and monitoring of the patients at the same time. We also provide incentives to the DOT providers to enhance their motivation and commitment for serving the patients with friendly environment. The project gave an honorarium to MDR-TB DOT providers (who live at

remote or hard to reach areas) and reimburse travel expense to collect SLDs from health facility store. The project is providing support for around 510 MDR-TB Providers (as of end of August, 2016).

Since July 2015, the CTB project is continuing social support package to MDR-TB patients (65% of the national coverage) at 19 selected districts and four city corporations, that includes monthly monetary support for purchasing nutritional diet by patients and travel cost (through Mobile banking) and monetary support for Investigations related to baseline assessment tests and monitoring tests (ancillary) to assess treatment efficacy, such as X-rays, renal and liver function by actual re-imbursement mechanism; transportation for patients and DOT providers, and mobile communication cost for DOT providers. Around 781 patients are receiving social support package by the project (as of end of August, 2016). Overall, the social support contributed to increased patient adherence to treatment continuation and success.

Table below showing improved adherence of the patients to treatment as data shows steady decrease in LTFU and good treatment success rate after introduction of the Social Support Package.



A MDR-TB DOT provider is observing drug intake of a MDR-TB patient at Patient's home.



A staff nurse is observing drug intake by a MDR-TB patient admitted to the hospital

Table 9: Improved adherence of patients to treatment

<b>Year</b>	<b>Enrolled (Jan to Dec)</b>	<b>LTFU%</b>	<b>Treatment Success %</b>	<b>Remarks</b>
2008	107	27	64	
2009	179	18	68	
2010	183	14	70	
2011	253	14	70	
2012	376	13	73	Social Support initiated from mid 2012
2013	495	10	73	
2014	716 (369 Jan. to June)	10	73	Treatment outcome report is available for patients enrolled during Jan. to June only.

In APA2, the project extended maximum support to GeneXpert sites to disseminate GeneXpert results to the recipients and respected referral centers immediately through mobile communication. The project provided mobile airtime bill to the responsible persons at respected GeneXpert sites.

The project continues to pay for sputum transport from field to MDR-TB diagnostic sites, as it is more convenient, cost effective, and provides better infection control; patient movement may also be a barrier to GeneXpert utilization. The project also provided financial support for a number of patients where sputum transport mechanism is not available or feasible. The project also provides financial support for courier bill at the NTRL/RTRLs for rapid sending of MDR-TB patients' follow up culture results to the MDR-TB treatment initiation centers and CTB field colleagues. The project field colleagues ensure availability of the reports at the treatments centers. The project provided support for sputum transport mechanism at 96 upazillas through reimbursing courier bill expense.

It is necessary to supervise and monitor the ongoing implementation status of MDR-TB treatment initiation Centers, diagnostic sites, Chest Diseases Clinic and MDR-TB Patients' home including MDR-TB DOT Providers in the community. Conducting Joint supervision helps the project and NTP to find and address the gaps at implementation level and also create an opportunity to provide on the job training for enhancing field level management capacity.

As part of CTB effort for strengthening NTP capacity towards sustaining and strengthening management quality and capacity of the MDR-TB Treatment Initiation Centers, the project conducted joint supervision at four MDR-TB sites-CDHs in Sylhet, Pabna, Khulna and Chittagong in APA2. The joint supervisory teams consisting of NTP, WHO, CTB officials and representatives of implementing partners visited the centers.

The team provided technical advice to correct and improve their activities and also took immediate action to solve identified problems, if feasible. During visits to patients' homes in

the community, the team interviewed the patients to assess the project support for implementation of cPMDT and social support package including patient satisfaction to health services. The team also visited patient relevant MDR-TB DOT Providers and interviewed them to explore their knowledge on basic facts of TB/MDR TB and comprehensive management including technique for counseling of the patients.



The Director MBDC and LD TB-Lep visited Chittagong with team RTRL Chittagong on 27 Sep, 2016.



The Director MBDC and LD TB-Lep visited CDH and interviewed MDR-TB patients in hospital wards on 27 Sep, 2016.



The Director MBDC and LD with team members interviewing MDR-TB patient and DOT Provider at a patient's home

Under the cPMDT program, it is essential to authenticate regular drug intake by patients, monitor adverse effects of the drugs and supervise the activities by DOT providers. Considering the importance, the NTP introduced "mHealth" application in 2013 to:

- Monitor MDR-TB DOT providers
- Monitor treatment compliance of MDR-TB patients
- Seek quick management for ADR
- Record MDR-TB DOT provider and MDR-TB patients' status

During APA2, the project supported trainings to all DOT providers of Narayanganj District, Gazipur District, Dhaka City Corporation, Khulna and Rangpur division. In APA2, DOT providers were trained on mHealth. Currently, a total of 298 MDR-TB DOT providers have been supervised by using the smart phone application covering 304 MDR-TB patients in 16 districts of Bangladesh. By supervising DOT providers through mobile device, treatment

adherence has been increased and the regularity of the DOT providers' presence to the patients' house reached to 89%. After analyzing mHealth usage, the project found several challenges in the field, including non-working phones, internet network problems, refresher trainings had not been done since DOT providers received their initial training, and new DOT providers were not adequately trained. To overcome these challenges, CTB increased the guidance and monitoring from central and provide guidance regarding mHealth application installation, on-site job training, and providing working phones.

Health managers from district and subdistrict (Upazila) level are now able to monitor DOT activities through the mHealth application and could take immediate action. There was no longer a need to physically visit a patient's house. All of the 304 patients' information, treatment start date, DOT providers' information and status are available and side effects could be monitored daily.

Table 10: Use of mHealth Applications for Patient Support

Variable	Jan-March, 2016	Apr-June, 2016	July-Sept,2016
% of trained DOTs providers using GPS	<50%	100%	100%
# of DOTs providers noting adverse drug reactions/side effects	19	130	132
# of providers using mHealth	257	290	289
# of patients covered by mHealth	291	342	304
# patients receiving Daily DOT & confirmed by mHealth (average per day)	185 (64%)	214 (63%)	226 (74%)

### Challenges:

1. English interface is not always understood by DOT provider.
2. Deleted/Uninstall/ not functioning / phone lost/SIM mHealth application from phone.
3. Difficulties reaching DOT providers immediately for troubleshooting by CTB field staff.
4. Low usage of side effects and contact tracing functions of mHealth.

### Solutions:

1. Update the mHealth mobile application, focusing on simplification of the application for the DOT provider.
2. Update the m-reporting system and add new features to increase the effectiveness.
3. Increase guidance and monitoring from central level.
4. Visiting the DOT provider by divisional and district coordinator for installing the application and troubleshooting of mobile phones.
5. Conduct training for 700 DOT providers and health managers to cover all over the country.

Among many challenges experienced by the NTP, hidden, undiagnosed MDR-TB cases are a priority in Bangladesh. NTP is far behind in achieving case detection of MDR-TB compared to expected case load as of first National Drug Resistant TB Survey in Bangladesh. As MDR-TB

is an airborne infectious disease like drug sensitive TB, there is high probability of hidden cases among the family members where one index case has been notified. Active case finding through contact investigation (CI) may detect hidden cases. Currently a number of program implementers are practicing CI at field level, but using their own method. There is no agreed national CI system for implementation, recording and reporting. Development of unified quality recording and reporting format and adoption of a single system for contact investigation throughout the country is now a prime demand for addressing the TB case detection gap in Bangladesh. With the said objective, CTB project organized a day long workshop inviting NTP officials and other stakeholders to come to the consensus to adopt the active strategy of CI nationally. Through that workshop, a decision has been taken to prepare to conduct CI as pilot to have experience and later to expand throughout the country. The project provided support to develop and print CI related recording and reporting formats with approval from NTP. The project also developed Standard Operating Procedure (SOP) in collaboration with NTP and partners to initiate implementation of CI for DS/DR TB as pilot.

NTP has different recording/reporting formats on different aspect of TB activities which have been used throughout the country by the government as well as other implementing partners since the program began in 1993. The NTP is adopting diverse innovative approaches following WHO as well as Stop TB Strategy and End TB Strategy at different stages of program implementation. NTP is updating its related formats by incorporating new components following new global strategies for collecting and analyzing records and reports routinely as well as periodically to evaluate and assess the program performance, aiming to identify areas and gaps and to overcome the gaps accordingly. Orientation of the field health care providers is needed to update them on the new areas of the recording and reporting formats. CTB provided support to NTP through organizing two days training, inviting relevant invitees from NIDCH and different partners to orient them on different NTP approved recording formats. In the training the facilitators and project staff demonstrated all recording formats and clearly explained all newly NTP adopted areas. There was detailed discussion to make the invites understand the critical areas.

Alignment of MDR-TB recording and reporting information with e-TB Manager was also discussed during the training. During joint supervision of the MDR-TB Treatment Initiation Centers, the teams randomly check the inputs in e-TB Manager related to MDR-TB patient management and confirmed that MDR-TB patients' individual information was entered into e-TB Manager, which was also aggregated monthly.

#	Outcome Indicators	Baseline (Year/ timeframe)	Target	Result
			Y2	Y2
3.1.3	Case notification rate	122	131	130 (Source NTP 2016 annual report [2015 results])
3.1.4	Number of MDR-TB cases detected	994	1,900	896 (NTP revised MDR targets down after CTB's PMP was approved)
3.1.8	Percent of TB cases (all forms) diagnosed among	2.9%	3.8%	4% (7,984 cases)

	children (0-14)			NTP annual report 2016
3.2.4	Number of MDR-TB <sup>1</sup> cases initiating second-line treatment	945	1,900	880
3.2.7	Percent of MDR-TB cases successfully treated	73% (NTP, 2012 cohort data)	73%	73% (2013 cohort)
N/A	Number of extra-pulmonary TB cases detected	37,712 (Source: NTP, 2014)	46,400	43,767

## Objective 2. Prevention

### Sub-objective 4. Targeted screening for active TB

#### IR4.1 Contact investigation implemented and monitored

Although contact investigation is an acknowledged standard component of the TB control program and part of the National Operational Guidelines, it has not been properly implemented. Roles and responsibilities, including SOPs for NTP staff, and recording and registration mechanisms did not previously exist. Under APA2, CTB helped to ensure the final approval of contact investigation and recording formats which will be distributed in selected pilot areas. CTB and several stakeholder groups developed a draft implementation SOP, which resulted in an NTP-endorsed screening tool and recording and reporting formats. This draft SOP will be introduced in the first quarter of APA3 in the selected areas (Sylhet, Tangail) for the implementation of the contact investigation for active case findings for six months and will be finalized based on the experience of that 6 months period.

CTB has focused their attention on improving TB detection among children through different interventions through the NGOs, including early recognition and referral of presumptive child cases, contact investigation of TB index cases to find TB diseased children and IPT as TB prophylaxis. Another important part is also the different type of ACSM activities NGOs organize to mobilize parents and communities to be aware of children's TB and bring them timely to the clinic. While the Bangladesh Pediatric Association (BPA) and the Centre for Woman and Child Health (CWCH) are receiving a sub award (grant mechanism) to implement their capacity building activities in the division of Dhaka (APA1) and Sylhet and district Tangail (APA2), the eight other sub grantees, grass root level NGOs, are using their sub awards to implement childhood TB activities among the most vulnerable populations, urban (slums) and rural (e.g. tea gardens).

As a result of this initiative the number of presumptive childhood TB cases increased. (See table below)

<sup>1</sup> Note that the NTP is revising the national MDR target and CTB will adjust accordingly

Table 11: Status of childhood TB detection by the sub grantees

Indicator	Jul-Sep, 2015	Oct-Dec, 2015	Jan-Mar, 2016	Apr-Jun, 2016	Jul-Sep, 2016	Total
# of TB symptomatic children identified through contact investigation	1,031	1,439	6,266	12,438	10,149	31,323
#/% of child TB cases identified through contact investigation (sub awardees)	25	146	151	171	179	672
# of total child TB cases identified through CI and referral( sub-awards)	402	357	337	478	373	1,947

#### **IR 4.2 TB social determinants identified, appropriate interventions designed, implemented and monitored**

The NTP faces challenges to ensure access to TB preventive and curative services in urban settings. In urban areas, partner NGOs giving health and TB services have limited human resources and both population density and poverty are high. As a result, an active case finding approach is difficult in some areas, especially in slums and among the vulnerable population like HIV high risk, street dwellers, and internal migrants. As part of the national strategic plan, one of the priorities if NTP is increasing access to the poor, malnourished children, migrants and those living in urban slums. The strategic plan calls for expanding successful models which will be standardized as NTP policies covering high risk population, urban slum and migratory populations (National Strategic Plan for TB Control, 2015-2020, page 62). Based on this part of the NSP CTB in coordination with NTP arrange the Urban TB consultative workshop with stakeholders in TB, other partners of the health sector with the technical assistance of STTA on April 6-7, 2016 with a total of 28 participants (19 male, 9 female). The specific objectives were to share experiences, map the different vulnerable groups and existing organizations and initiatives, identify the key bottlenecks in both early case finding as case holding and find solutions given the available resources and new opportunities. Action point and a four-year M&E plan have been set addressing the recommendations from the participants. Recommendations are addressed in the National PPM strategic plan, and CTB annual work plan.

The End TB Strategy 2016-2035 looks to adapt and implement new country-specific interventions that have not been routinely fulfilled by national TB programs so far. It now requires close multi-sectoral collaboration and engagement of diverse stakeholders ranging from relevant ministries to affected communities. To be aligned with the strategy and to address the first pillar, "Integrated, patient-centered TB care and prevention," NTP will now also focus on nutrition. There is a need to integrate nutritional programs with TB control programs, particularly in countries with a high TB burden like Bangladesh. To accomplish this, CTB and NTP held a workshop titled "Consultative Meeting with National Nutrition Services," on June 30, 2016 to establish linkage and a referral system among the DOTS corner and the nutrition corner of the government health premises, and to incorporate TB

messages in their training curriculum and referral form. In this meeting they proposed establishing a TB/Nutrition committee. The next meeting will be held in the first quarter of APA3, where the three selected areas will be finalized to implement this new strategy.

The CTB project intends to implement a town (urban) based approach to integrate TB with nutrition services. CTB, with NTP leadership, will use necessary operational guidelines, TB screening tools and IEC materials to provide the orientation to nutrition service providers. During the service delivery at the community level, these cadres have played an important role for active TB screening of women, adolescents, and children, improved community knowledge and perception about the disease, and generated demand for TB services. To involve Town Federation Members, we are continuing to orient them. Leaders who are maintaining the registers and monitoring members in the field will help with better follow-up. CTB conducted 12 meeting with these community members and referred about 117 symptomatic patients, of which 17 were diagnosed with TB.

#	Outcome Indicators	Baseline (Year/ timeframe)	Target	Result
			Y2	Y2
4.1.2	Number and percent of children (under 5) who are contacts of bacteriologically-confirmed TB cases that are screened for TB	0	5,850	9,833 (Jan-Dec' 2015)
		0%	100%	100%

## Sub-objective 5. Infection control

### IR5.1 Compliance with quality TB-IC measures in health care, community and congregate settings ensured.

TB Infection Prevention and Control (TB IPC) is a combination of measures aimed at minimizing the Risk of TB/MDR-TB transmission from patient to population, patient to HCWs or patient to patient. This practice is not adequately followed at health facilities, laboratories and microscopy centers. Actions against TB infection transmission among population, patients and health care providers need to be addressed and scaled up. HCWs are at most risk of TB/MDR-TB infection and disease compared to other general populations.

To address the issue, NTP developed the National Guidelines for TB IPC in 2011. To accentuate practicing of TB IPC, the project extended support to NTP to formulate a TB IPC Working Group with Terms of Reference (TOR). The first TB IPC Working Group meeting was held on June 28, 2016, where FAST (Finding TB or MDR-TB patients Actively, Separating Safely, and Treating Effectively) results of NIDCH, BIRDEM and CDH Chittagong were shared and discussed. The group decided to restart FAST in two MDR-TB TICs (Chittagong, NIDCH). NTP also decided to formulate a small working group to assess its feasibility and to perform some ground work for the relaunch of FAST at selected health facilities.

In the second meeting, the members of the working group decided to relaunch FAST at NIDCH covering only inpatients with existing human and additional resources. It was also

decided that the new NTP approved diagnostic algorithm will be implemented at 10 new GeneXpert sites.



The second meeting of TB IPC working group held on August 28, 2016

The NTP plans to distribute the TB IPC guidelines country-wide for health facility staff to implement in their facilities and build their capacity. Health facilities have used TB IPC activities to some extent but not in a systematic manner and not up to the standard level.

CTB and the NTP conducted a risk assessment analysis at three facilities (NIDCH/BIRDEM & IDH) using risk assessment tool to plan for capacity building on TBIPC through organizing training.

The project, organized training of the trainers (TOT) to build capacity to facilitate the training on TB IPC for the health staff of MDR-TB treatment initiation centers as well as other general hospitals. Twenty-four HCWs from two MDR-TB and three general hospitals participated in two days of TB-IPC training. Among the trainers, four were from the NTP, one was from the Damien Foundation, one was from BRAC, and one trainer from CTB. The draft training manual developed by the project with support from STTA was used in the training for group work. The participants were arranged at five groups and after each session each group presented their exercise and learning. The training and participants performance was evaluated through using evaluation tools.

Main learning points were topics on FAST, basics of TB-IPC, personal protection, TB risk assessment and health education.

Health facilities prepared TB-IPC plans with support from the facilitators. Supportive supervision is expected by the participants, to ensure TB IPC implementation in their facilities.



Newly trained nurse and patient using personal protective equipment as part of infection control procedures

The project, with support from STTA and trainers, finalized the TB IPC Training curriculum and manuals for facilitators and participants. The final version of the training curriculum, manuals for facilitators and participants was shared with the NTP. The NTP already started to use these documents as guiding tool in the TB IPC training sessions for capacity build-up of the health facility staff. NTP organized in total 12 batches of training using these documents and the participants invited from upazilla health complexes. Four participants were invited by the NTP from each upazilla.

Khulna CDH, BIRDEM hospital and Lalmonirhat Sadar Hospital developed their IPC Committee and IPC plan after the IPC training and are implementing IPC to some extent using available resources.

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার  
চিকিৎসা তত্ত্বাবধায়কের কার্যালয়  
বক্ষব্যাধি হাসপাতাল, খুলনা।

স্মারক নং-বাক্যবিধিহাস্য/খুল/শা-১/১৬/

তারিখঃ

ইং।

বিষয়ঃ-টিবি আইপিএসি কমিটি গঠন প্রসঙ্গে।

অত্র হাসপাতালের নিম্নবর্ণিত কর্মকর্তা/কর্মচারীদের সমন্বয়ে টিবি আইপিএসি সম্পর্কে বিভিন্ন কার্য সম্পাদনের মাধ্যমে একটি কমিটি গঠন করা হইলঃ-

কমিটি নিম্নলিখঃ-

১.	চিকিৎসা তত্ত্বাবধায়ক	সভাপতি
২.	নিম্নের কনসাল্টেন্ট	সহ সভাপতি
৩.	ডাঃ এস.এম.আব্দুল্লাহুজ্জামান, মেডিকেল অফিসার	সদস্য সচিব
৪.	ডাঃ শেখ মোহাম্মদ কামাল হোসেন, আবাসিক মেডিকেল অফিসার	সদস্য
৫.	উপ-সেবা তত্ত্বাবধায়ক	সদস্য
৬.	মলিনা বিশ্বাস, নিম্নের ইক নার্স	সদস্য
৭.	মোঃ আব্দুর রশীদ মেডিকেল টেক (ল্যাব)	সদস্য
৮.	মোমেনা খাতুন, অফিস সহকারী কাম- কম্পিউটার অপারেটর (প্রধান সহকারী দায়িত্বপ্রাপ্ত)	সদস্য
৯.	মোঃ মনিরুজ্জামান মল্লিক, ফার্মাসিট (ওয়ার্ড মাস্টার দায়িত্বপ্রাপ্ত)	সদস্য

স্বাক্ষরঃ  
(ডাঃ মোঃ আব্দুল্লাহুজ্জামান হোসেন)  
চিকিৎসা তত্ত্বাবধায়ক (ভারপ্রাপ্ত)  
বক্ষব্যাধি হাসপাতাল, খুলনা।

স্মারক নং-বাক্যবিধিহাস্য/খুল/শা-১/১৬/৬৭৬ (১৫)

তারিখঃ ১৬/৭/১৬ ইং।

অনুলিপি সদয় অবগতি / অবগতি ও প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য প্রেরণ করা হইলঃ-

১. মহা-পরিচালক, স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা-১২১২। (পূরি আকর্ষণঃ- সহকারী পরিচালক)।
২. পরিচালক, এম.বি.ডি সি ও লাইন ডাইরেক্টর, টি.বি.লেন্সেসী এনটিপি, স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা ১২১২।
৩. পরিচালক (স্বাস্থ্য), খুলনা বিভাগ, খুলনা।
৪. উপ-পরিচালক, এমবিডিএসি এন্ড প্রোগ্রাম ম্যানেজার টিবি এনটিপি, স্বাস্থ্য অধিদপ্তর, মহাখালী, ঢাকা।
৫. ডাঃ আনোয়ারুল আজান, বিভাগীয় টিবি এক্সপার্ট, খুলনা। (এনটিপি, বাংলাদেশ)।
৬. চিকিৎসা তত্ত্বাবধায়ক, সভাপতি টিবিআইপিএসি কমিটি, অত্র হাসপাতাল।
৭. নিম্নের কনসাল্টেন্ট, সহ সভাপতি, টিবিআইপিএসি কমিটি, অত্র হাসপাতাল।
৮. ডাঃ শেখ মোহাম্মদ কামাল হোসেন, আবাসিক মেডিকেল অফিসার, অত্র হাসপাতাল।
৯. ডাঃ এস.এম.আব্দুল্লাহুজ্জামান, মেডিকেল অফিসার, সদস্য সচিব টিবিআইপিএসি কমিটি, অত্র হাসপাতাল।
১০. উপ-সেবা তত্ত্বাবধায়ক, সদস্য, টিবিআইপিএসি কমিটি, অত্র হাসপাতাল।
১১. মলিনা বিশ্বাস, নিম্নের ইক নার্স, সদস্য, টিবিআইপিএসি কমিটি, অত্র হাসপাতাল।
১২. মোঃ আব্দুর রশীদ মেডিকেল টেক (ল্যাব), সদস্য, টিবিআইপিএসি কমিটি, অত্র হাসপাতাল।
১৩. মোমেনা খাতুন, অফিস সহকারী কাম- কম্পিউটার অপারেটর (প্রধান সহকারী দায়িত্বপ্রাপ্ত), সদস্য, টিবিআইপিএসি কমিটি, অত্র হাসপাতাল।
১৪. মোঃ মনিরুজ্জামান মল্লিক, ফার্মাসিট (ওয়ার্ড মাস্টার দায়িত্বপ্রাপ্ত), সদস্য, টিবিআইপিএসি কমিটি, অত্র হাসপাতাল।
১৫. মোঃ সাহাবুজ্জামান হোসেন, ডিভিশনাল কো-অর্ডিনেটর, ইউআরসি, আর.টি.এল, অত্র হাসপাতাল।

চিকিৎসা তত্ত্বাবধায়ক (ভারপ্রাপ্ত)  
বক্ষব্যাধি হাসপাতাল, খুলনা।

তারিখঃ ১৬/৭/১৬

Above is the TB IPC Committee (In Bangla) formulation notice from the authority at CDH, Khulna after training.



The CDH, Khulna arranged local trash boxes to discard sharp and other waste materials.

NTP developed a checklist to use during supervision to assess the program implementation status. The checklist has a separate section for TB IPC to guide the supervisors during supervision. With support by the project the section on TB IPC in the checklist (Annex IV) was updated.

FAST is an infection control strategy which prioritizes rapidly diagnosing and putting patients on effective treatment. FAST stands for Finding TB or MDR-TB patients Actively, Separating Safely, and Treating Effectively. NTP is lagging behind in achieving the target of case detection, for both DS and MDR-TB. To support the NTP in finding the hidden cases among Non TB and Non MDR-TB patients, a previous USAID-funded project initiated FAST at three hospitals-NIDCH, BIRDEM and CDH Chittagong. CTB conducted assessment at those sites during APA2 of FAST implementation.

It was assessed that NIDCH already decreased their activities on FAST as supply of Xpert cartridges from NTP was inadequate. BIRDEM was found to continuing the FAST. CDH Chittagong also stopped FAST implementation as the involved officials have not made this a high priority.

The records on FAST showed that, 488 (9.9%) MTB positive and 42 (8.6%) RR cases were detected among 4,916 patients with other lung diseases without TB History whereas 245 (22%) TB positive and 16 (6.5%) MDR-TB cases were detected among 1112 patients with other lung diseases with TB History.

The project discussed the issue on re initiation of FAST at the facilities at the TB IPC working group meetings.

Use of personal protective respirators is recommended for HCWs when caring for patients or those suspected of having TB or MDR-TB. HCWs should use particulate respirators during high-risk aerosol-generating procedures associated with TB or MDR-TB diagnostic sites. Visitors or family members also should wear the respirators when in close contact with the infectious patients.

To support NTP for adequate availability of the respirators, the project bought 50,000 respirators to hand over to NTP store for distribution in APA 2.

#	Outcome Indicators	Baseline (Year/ timeframe)	Target	Result
			Y2	Y2
5.1.2	Number and percent of health facilities implementing TB IC measures with Challenge TB support (PMDT services)	0 (CTB 2014)	4	3
		0% (CTB 2014)	67%	50%

### Sub-objective 6. Management of latent TB infection

#	Outcome Indicators	Baseline (Year/ timeframe)	Target	Result
			Y2	Y2
6.1.11	Number of children under the age of 5 years who initiate IPT	3,848 (NTP 2014)	4,500	6,521 (Jan-Dec 2015) 4,291 (Jan-Jun' 2016)

## Objective 3. Strengthened TB Platforms

### Sub-objective 7. Political commitment and leadership

People across the world observe World TB Day (WTD) every year on March 24th.

WTD is established as an annual event worldwide to be observed by the people to create awareness on tuberculosis – its transmission, prevention, diagnosis and cure. With the 2016 WTD theme “Unite to End TB” in mind, youth groups from the special vulnerable community in Mirpur created mural paintings to express, through artwork, tuberculosis’ mode of transmission, prevention, diagnosis and cure. Paintings also focused on childhood tuberculosis and community engagement. Challenge TB organized this event in two selected schools and three pharmacies in partnership with The Salvation Army, an international NGO working with the vulnerable population since 1972. NTP, partner-stakeholders, Management Sciences for Health (MSH), and KNCV were on site to grace the occasion and render recognition to these youth groups.

A meeting for the formation of a budget mobilization (caucus) group was held on March 16, 2016, where 22 participants from different organization attended. This meeting was treated as the first meeting of the group.

#	Outcome Indicators	Baseline (Year/ timeframe)	Target	Result
			Y2	Y2
7.2.1	Percent of NTP budget financed by domestic resources	4.9% (NTP 2014)	13%	12% (Global TB report 2016) <sup>2</sup>

#### **Sub-objective 8. Comprehensive partnerships and informed community involvement**

No activities in APA2

#### **Sub-objective 9. Drug and commodity management systems**

No activities in APA2

#### **Sub-objective 10. Quality data, surveillance and M&E**

CTB has set up an intensive monitoring and supervision system for effective implementation of TB program and PMDT activities. The project field staff regularly monitor the DOT centers and PMDT sites. The Outpatient MDR-TB Team members regularly monitor and supervise the MDR-TB DOT providers. In addition, project field staffs make field visit to monitor DOT services for MDR-TB patients, review patient records to monitor treatment compliance, assess patient management needs and take follow up actions in discussion with the Outpatient MDR-TB Team.

The project routinely participates in performance review meetings at the district level with the district and divisional level GOB health authority to improve quality of DS TB and MDR-TB services. These meetings were organized to identify different issues including coordination of activities, availability and supply of drugs, patient compliance with treatment, patient support, side effects management, generation of social support for the patients, and roles and responsibilities of the DOT providers and project staff in resolving these issues.

CTB planned to conduct quarterly meeting with its sub-grants and field based staff in its Dhaka office. The meetings provide better coordination, regular review of performances, and implementation of interventions. In APA2, two meetings were held with sub-grantees on Nov 25, 2016, and March 28, 2016. In these meeting with sub-grants from program and finance staff of each organization were presented and the discussed about programmatic updates as per target, lesson learned and challenges. Each organization had a presentation on quarterly progresses based on the target, different bottleneck on implementing the activities and future plan. Uninterrupted fund disbursement, regular monitoring and continuous support & coordination from CTB field staff is very crucial for smooth implementing of activities within timeframe.

Quarterly meetings were also organized with CTB field-based staffs on Nov 26, 2015, March 29, 2016 and June 6, 2016. In these meetings all the Divisional Coordinators presented their respective divisional progress, achievements, and challenges, and solutions were identified. Other major issues discussed were defining the role of the Divisional Coordinators

<sup>2</sup> The official NTP2015 report is not published yet, so data is reported as NA till official.

& District Coordinators; experiences & challenges of providing social support to DRTB patients, data collection & coordination with local Government staff & NGOs, re-evaluate the current geographical distribution of the field staff over divisions and districts. Based on the discussion in quarterly meetings coordination & linkages were strengthened among sub-grantees and CTB field staff in respective areas. As per results of discussion in quarterly meeting, CTB facilitated to circulate a letter from NTP to all divisional directors (Health) and Civil Surgeons to include Divisional Coordinators & District Coordinators of CTB in regular divisional & district coordination meeting as formal participants.

CTB has developed a data quality assurance (DQA) tool in Q2. NTP has agreed on including this DQA tool to the national M&E Framework.

DQA visits were conducted in CTB sub-grantees area to check the consistency of the reported data with facility based report, review uniformity of reported data with all relevant registers, forms. Apart from quantitative review, several qualitative issues like timeliness, reliability, consistency of the formats, knowledge of the field staff on filling the formats, supervision issues were reviewed.

Major Findings of these visits are:

- In most of the cases reported data are found almost consistent with report at facility level with few exceptions.
- Presumptive cases which are referred by CTB staffs or CTB activities were not found marked in the TB Laboratory Registry (TB 04).
- Knowledge level of partner's M&E officer and other staff on TB and reporting system was not up to the mark. Many staff do not have the updated TB related information and do not know definitions of NTP guideline.
- Internal data quality assurance visit and monitoring visit was very insufficient and there is very little evidence of reviewing documentation.
- Methods and documentation of contact investigation are not properly followed.
- No information regarding GeneXpert test & result was recorded in the TB Register (TB 03), TB Laboratory Register (TB 04) or in Treatment Card (TB 01). This gap is generalized. It was recommended to maintain GeneXpert related information on all relevant documents.
- Child TB cases diagnosed in the center are reported as the contribution of CTB activities. This is a general observation. RDRS is instructed to report those child under CTB for whom CTB staffs are actively involved from beginning to end of diagnosis procedure and any social support is provided.
- IPT was missed for few cases due to proper knowledge of TLCA. It is recommended to provide correct knowledge to TLCAs of RDRS in a formal session.
- Date of TB 04 did not match with TB 01 for test at diagnosis (0 month). It was recommended to maintain first recording date and not the test completion date.
- Laboratory number did not match with Presumptive register for some cases. It was recommended to maintain same laboratory number in all relevant register and documents.

After each DQA visit, findings were shared with respective NGO authorities.

Through discussion with different stakeholders and program experience it was evident that there is very minimum understanding on monitoring & evaluation among field level staff. Again, NTP has changed its different register and reporting format in recent years and field level staff were not oriented properly on this changes and field level staff has different level of understanding on existing & revised registers & format. People also have several misunderstanding on the definition and terminology used in the registers and reporting format. Moreover, there are deficit in analysis of reported data at local level and use of this data for local level planning & program improvement. CTB has intended to complement SIAPS project of MSH to ensure scale and implementation of e-TB Manager in CTB priority area. In these circumstances, Challenge TB project has planned to conduct one central level M&E training for CTB field staff to orient them on the exiting format as they can cascade the similar training at divisional level. As a part of that, one group of TOT was organized at MSH Dhaka office on August 16-17, 2016, where all field based staff participated. As a continuation of this, seven batches of training were conducted in Dhaka, Rajshahi Khulna, Sylhet, Rangpur, Chittagong and Barisal Division where CTB field staff were the main resource. In these training total 226 participants (195 male, 31 female) attended.

Program Organizers of different districts, representatives from laboratory, CDH, district & divisional representatives from several NGOs were the participants. It is assumed that these participants would transfer this enhanced knowledge to the ground and that the reporting system would be improved in the future.

Due to pending approval from USAID on expansion and implementation of e-TB Manager, CTB held off including e-TB Manager in this training package.

NTP, Bangladesh needs to prioritize research agendas to conduct operational research through assessing challenging areas and constraints. This initiative improved ongoing activities and help to undertake new approaches, increase competences and innovative capacity. The TB program will be able to achieve global targets of TB through Implications of TB research findings into policy.

With support from CTB, the NTP revived the Research Working Group (RWG) in APA1.

The project extended support to NTP, Bangladesh to prioritize nine research Topics through organization of a two-day workshop which was finalized through a series of meetings in APA1.

CTB further supported to NTP for capacity-building on TB operational research (OR) protocol development through organization and facilitation of a five days workshop in April 2016. Before the workshop, NTP approved the updated shortlist of prioritized research topics developed with CTB, NTP and USAID (April 3).

Four topics were selected:

- Explore factors associated to LTFU in cPMDT
- Measure burden of TB in TB HCWs
- Evaluate Active Contact Investigation
- Role of GeneXpert for TB detection in smear negative presumptive cases

The workshop was conducted with support from CTB to build capacity on development of research protocols on an agreed number of priority topics. TB research experts from the NTP, WHO, Experts from research Institutes and partners including technical advisors from USAID and Challenge TB, Bangladesh facilitated in the workshop. The invited participants were from NTP/BRAC/NIPSOM/NIDCH/250 Bedded Chest Diseases Hospital/ ICDDR,B/ Damien Foundation/WHO/IEDCR (18 participants). Five groups were formed for group work and the facilitators were assigned for each group to provide guidance. The core group of participants expressed a strong interest for learning how to develop a research protocol. The STTA (KNCV) provided guidance from distance to each group for final shaping of the draft protocol on identified topics. This would serve capacity building purposes and would strengthen research collaboration between NTP and research organizations.

#	Outcome Indicators	Baseline (Year/ timeframe)	Target	Result
			Y2	Y2
10.1.4	Status of electronic recording and reporting system	2 (210 sub-district/ SIAPS)	N/A	2

#### Sub-objective 11. Human resource development

#	Outcome Indicators	Baseline (Year/ timeframe)	Target	Result
			Y2	Y2
11.1.3	Number of health care workers trained	Male – 0 (CTB 2014)	4,200	1,468 <sup>3</sup>
		Female – 0 (CTB 2014)	2,800	199
		Total – 0 (CTB 2014)	7,000	1,667
N/A	Private providers trained in TB screening, identification, and referral including both graduate and non-graduate	0 (CTB 2014)	2,800	896 <sup>4</sup>

<sup>3</sup> From subgrants, which started in Jan 2016. Quarter 4 not added yet.

<sup>4</sup> Same as above

#### 4. Challenge TB Support to Global Fund Implementation

##### Current Global Fund TB Grants

<b>Name of grant &amp; principal recipient</b> <i>(i.e., Tuberculosis NFM - MoH)</i>	<b>Average Rating*</b>	<b>Current Rating</b>	<b>Total Approved/Signed Amount**</b>	<b>Total Committed Amount</b>	<b>Total Disbursed to Date</b>
BGD-T-NTP	A2	A2	USD 31,647,459	USD 17,574,484	USD 13,138,075
BGD-T-BRAC	A1	A1	USD 43,778,880	USD 19,360,305	USD 19,100,749

\* Since January 2011

\*\* Current NFM grant not cumulative amount; this information can be found on GF website or ask in country if possible.

##### In-country Global Fund status - key updates, current conditions, challenges and bottlenecks

The country is currently implementing the New Funding Model (NFM) amounting of \$ 75.4M for both PRs. Due to budget limitations established by the Global Fund, 800 staff positions from PR2 (BRAC) were abolished which created a big vacuum in the TB Control Program and greatly hampered the field level activity. BRAC did not eliminate activities in their entirety, but scaled back their work in the areas previously covered by these staff, which included most areas of basic TB management, such as sputum collection, patient registration, ensuring DOT, record keeping, patient's house visit, data entry in eTB manager, etc. Recently, NTP has recruited 200 TB and Leprosy Control Agents (TLCAs), and few officers which helped to overcome the vacuum to a little extent.

NTP procured 10 GeneXpert MTB/RIF which are waiting to be installed in the selected sites. The machines were supposed to be installed by July 2016, but due to some bureaucratic process and frequent change in the NTP leadership the installation has still not happened. CTB is working with the TB Lab Working Group to facilitate the decision process, but we continue to face challenges with site preparations, which are outside CTB's mandate. CTB's current estimate is that this may not be completed until April 2017. Recently, NTP also has procured 90,000 GeneXpert cartridges which are now being used.

NTP had planned limited number of training program through the Global Fund (GF) which have been conducted as per plan. As per the division of activities between NTP and BRAC, the NTP primarily organized central-level trainings (such as management training on tuberculosis, PMDT, infection control, etc.), while BRAC focused on the peripheral trainings. FLD and SLD were budgeted in GF and procured timely from GDF. NTP has conducted a Nationwide TB Prevalence Survey, the result of which is expected to be available by October 2016. An epidemiological and impact analysis (epi analysis) should be included with the TB Prevalence Survey result to update NTP National Strategic Plan (NSP). CTB is providing TA for this epi analysis and it will be precede the development of the new Concept Note that will provide the basis for funding applications to the GF under the new funding cycle. The current funding support will end in December, 2017.

#### Challenges:

- Scarcity of epidemiological data
- Less Involvement of private sectors
- New and effective strategies to increase case detection
- Continuation of MDR surveillance
- Diagnosis and management of childhood TB/extra pulmonary TB
- Development of rapid diagnostic methods
- Extension of DOTS to work place, hard reach areas

#### **Challenge TB involvement in GF support/implementation and any actions taken during Year 2**

CTB is working in close collaboration and coordination with GF, in partnership with the NTP. CTB is providing technical support to GF-supported trainings, specifically on PMDT, and provides technical assistance and support to cover other identified gaps.

In March, 2016, the CTB team met with Richard Cunliffe, Fund Portfolio Manager, and the High Impact Asia Department on the sideline of the ICAAP Conference. They discussed various aspects of the proposed PPM model. The CTB team advised GF to consider installation of new GeneXpert machines as a comprehensive package (satisfactory infrastructure, adequate manpower and steady supply of cartridges) to overcome the shortcomings at proposed sites.

As part of its commitment to providing continuous support to the CCM, CTB appointed two program officers (POs) on a contractual basis to work at the BCCM Secretariat. They will assist and facilitate the Civil Society Organizations (CSO) constituency mobilization and engagement. This support will enable BCCM Secretariat in fulfilling its mandate for CSO election. Furthermore, this will ensure compliance with CCM eligibility requirements as per Global Fund's Eligibility and Performance Assessment Tool. This provides a good example of synergy of CTB with the Global Fund activities in the country.

A GF mission led by Fund Portfolio Manager Richard Cunliffe visited the CTB office on June 20. They appreciated the placement of the Program Officers at the BCCM secretariat. Ten GeneXpert machines reached Dhaka airport and were scheduled to be deployed at chosen sites within the next month. Four new machines would replace completely nonfunctional ones at old sites (supported by CTB) and six would be installed at medical college hospitals. The maintenance of these 10 machines will be totally covered through warranties procured by GF. Local Cepheid agency and NTP personnel will be responsible for trouble shooting. They agreed that the economic burden study may be deferred.

## **5. Challenge TB Success Story**

### **Strengthening of TB Infection Prevention & Control (TB IPC) activities in Khulna Chest Disease Hospital (CDH)**

When Laboni Begum was diagnosed with drug-resistant tuberculosis (DR-TB), she weighed just 32 kg. As she is also married and the mother of a young child, TB prevention and care for her family was a high priority.

TB infection, prevention and control (TB-IPC) is a combination of measures focused on minimizing the risk of transmission from patients to everyone around them, including family members, the public, health care providers, and other patients. Challenge TB is working to raise awareness of the importance of TB-IPC measures and to educate staff in health facilities throughout the region.

The project worked with the National TB Program to develop a TB-IPC curriculum and train a core group of trainers and officials from five health facilities, including Khulna Chest Disease Hospital (CDH), where Begum received her treatment. The hospital has four wards – two for women and two for men – that specifically treat patients with multi-drug resistant-TB (MDR-TB).

Challenge TB worked with the CDH to strengthen its TB-IPC protocol, and organized a two-day workshop for four health care workers from the facility. As a result of the training, the workers formed a TB-IPC committee to better coordinate and supervise TB-IPC activities at the hospital.

The committee assigned two nurses to monitor TB-IPC activities among patients and created new procedures, including having separate wards for sputum smear positive and negative MDR-TB patients, and displaying information, education and communication materials throughout the facility. A small working group regularly collects all sharp items and other waste products from each ward and this contaminated refuse is then incinerated.

After nearly two months of receiving the proper medication Begum's treatment has worked, she is much healthier and weighs 39 kg. Her husband and son were tested for TB, and both were negative.

Challenge TB continues to work to increase the number of TB-IPC materials available and to maintain good quality TB-IPC activities at the facility.



Laboni Begum later in treatment with improved IPC measures

## **6. Operations Research**

No Operations Research was undertaken by CTB in APA2. CTB supported a workshop to build the capacity off partners in Bangladesh to develop OR protocols, but none of the protocols was accepted for ongoing research at this time. Icdrr,b is working with CTB, but on specific aspects of implementation, rather than as a research partner.

## 7. Key Challenges during Implementation and Actions to Overcome Them

Challenge	Actions to overcome challenges
<b>Technical</b>	
Lack of institutionalization of roll out of mHealth System	Discussions underway with BRAC and the NTP to expand mHealth nationwide & transition to the NTP; advocating for a counterpart at NTP to increase ownership
Limited GeneXpert Functionality	Ties with Cepheid's local agency were strengthened significantly, and CTB provided active support to the NTP to accelerate the return of modules. Partly due to CTB's lobbying, Cepheid is transitioning Xpert maintenance support to a Bangladeshi firm in 2016, accelerating response time and eliminating delays due to shipping or customs issues for the NTP.
Customs clearance of the containerized laboratory was blocked due to requirement for government to pay VAT tax, and was very complicated and expensive situation	CTB Lab advisor played an instrumental role in overcoming these challenges through extensive coordination with NTP and Customs department, until finally, all the taxes, VAT were paid by Bangladesh, and Government and customs clearances was completed successfully
Notification of TB cases from the Private sector is low	Support country to have strategic plan; PPM committee restructured; conducted study of situation; advocating for mandatory notification
Low national detection of MDRTB patients against the target	NTP to revisit the target and correct
IPT implementation and reporting is weak overall nationally	CTB regularly advocating in meetings & forums; included in field supervisory visits by CTB/government staff
Low number of presumptive DRTB patients referred to Gene Xpert sites	CTB developed & introduced history taking tool, sensitization workshop; worked with lab and implementing partners
Active case finding for adults and children is not expanded nationally	Advocating with implementing partners; developed SOP, register and recording formats for piloting
Pending decision of digitalization of TB data through e-TB manager or DHIS2	Continued discussions with USAID, SIAPS, NTP, and DGMIS to decide direction
<b>Administrative</b>	
NGO Affairs Bureau registration process for sub-awards takes a very	Resolved for APA2 grants through hard work. Future grants will be for multiple years, so no need

long time (4-6 months)	to go through this process again.
Fast turn-around time of incumbent NTP Line Director and NTP Program Manager due to existing system.	Minimal action possible, but together with USAID we have advocated for adjustments in the appointment process.
Political and security situation in the country can inhibit timely project implementation and STTA visits.	Non-essential STTA was halted for a brief time following the Holy Bakery attack. We monitor the security situation on an ongoing basis, and will adapt activities as necessary.
Resignation of senior technical advisor and country project director left team short staffed.	A new Technical Director (replacing the STA position) is now hired and started as of September 1, interim CPD coverage has helped. CPD recruitment underway
Lack of supervision in high burden areas	Will hire more CTB staff; NTP field level staff is weak; educate them; advocate with NTP for more staff
NTP has very limited budget to undertake key activities or to oversee the program.	Ensure that budgetary support for critical program elements to improve and sustain the NTP program, much more to lead it, is in place (Strategic Implementation Plan of the MOHFW).

## **8. Lessons Learnt/ Next Steps**

Commitment of NTP and local health authority including all stakeholders is essential to achieve the desired goals. When the government counterparts are ready and committed to move forward on an initiative, results can be achieved quickly. During APA2, CTB was able to make significant progress in several areas due to this commitment: PPM Strategic Plan, mandatory case notification, and the installation of the BSL-3 in Sylhet. Through APA3 and beyond we will focus more on the institutionalization and sustainability of key CTB activities, as we help the NTP transition to more of a leadership role.

One successful area in APA2 was guiding the National Tuberculosis Control Program to set Public Private Mix as a priority. NTP responded well to this initiative promoted by CTB – restructuring the PPM committee and working group and creating a task force for mandatory notification. NTP also delegated enhanced responsibility to their PPM focal person to work closely with the partners. In the development of the National PPM Strategic Plan (PPM SP), CTB undertook several key roles: assisted NTP to play a stewardship role, engaged key TB stakeholders to take responsibilities, delegated key staff to work in a team, and encouraged all participants to share information and participate actively. As a result, the National PPM strategic plan evolved as a comprehensive costed document and will be used to guide the country to implement PPM activities through 2020.

The containerized BSL-3 for Sylhet could not have been installed without strong support from the NTP. Specific areas where NTP support was crucial included the customs clearance of the containerized laboratory, which the NTP paid for, and smoothing significant bureaucratic hurdles on site so that the crane could place the containers appropriately in a very short period of time.

From the GeneXpert experience during APA2, it was shown that there are still many MDR cases in the community. Decentralization of diagnostic facilities helped to increase the accessibility of services to patients and increased the number of cases diagnosed. It was crucial to make the GeneXpert network viable early in the CTB project. Despite tremendous efforts of CTB together with Cepheid local agency and NTP, not all the machines were fully functional. CTB learned that an in country service center is needed to overcome these limitations. CTB advocated for it and Cepheid agreed to set up a service center here by December, 2016. Further establishing this center, as well as the role of the NTP in ensuring the viability of GeneXpert machines will be a key priority in APA3.

During APA2, CTB continued to provide effective social support package for MDR-TB patients and MDR-TB DOT Providers in order to increase patients' adherence to complete treatment, bringing about the high treatment success rate (73%) and low LTFU rate (around 10%) seen in Bangladesh. While it is critical to transfer the responsibility and funding for this to the NTP, it was a key factor in the success of treating patients with MDR-TB.

Quality of services at MDR-TB treatment initiation centers is enhanced by conducting regular Joint Supervision visits by NTP with CTB. This activity will continue and be strengthened in APA3.

Because intensive monitoring of DOT providers may be ensured by means of TB mHealth and remote monitoring, the possibility of reducing the human resource burden for supervision is being introduced.

The FAST strategy reprioritizes infection control activities by placing increased emphasis on administrative infection controls. Rapidly diagnosing and treating TB patients is the best way to reduce the spread of TB. The FAST strategy needs to be used to diagnose TB or MDR-TB in a variety of health care and congregate settings.

Integrated approach and implementing collaborative activities is essential to reduce the dual burden of DM-TB. Activities with the largest provider of DM services in Bangladesh will continue.

The project has supported intensive training for the doctors and Health care workers to improve the capacity of the management of Childhood Tuberculosis of four districts of Sylhet division. However, child TB notification is still low in the trained district – it is still far from the estimated 10% of all notifications. Training alone is not enough to increase detection of child TB; it needs intensive effort from all sectors and to follow the ACF strategy to reach the target.

For the effective coverage and program sustainability it needs to minimize the existing funding gap and ensure the rational use of resources.

**Annex I: Year 2 Results on Mandatory Indicators as well as National Data on the Number of pre-/XDR-TB Cases Started on Bedaquiline or Delamanid**

<b>MANDATORY Indicators</b>				
<i>Please provide data for the following mandatory indicators:</i>				
<b>2.1.2 A current national TB laboratory operational plan exists and is used to prioritize, plan and implement interventions.</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Score</b> as of September 30, 2016	0	N/A	<b>Substantial</b>	A lab strategic Plan was developed by NTP in APA2 with technical support from CTB and this strategic plan was budgeted. An operational plan will be developed to implement this strategic plan in APA3.
<b>2.2.6 Number and percent of TB reference laboratories (national and intermediate) within the country implementing a TB-specific quality improvement program i.e. Laboratory Quality Management System</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Number and percent</b> as of September 30, 2016	1/3 (33%)	N/A	<b>Substantial</b>	
<b>2.2.7 Number of GLI-approved TB microscopy network standards met</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>

<b>Number of standards met</b> as of September 30, 2016	5 out of 11	N/A	<b>Moderate</b>	Met standards 2, 6, 7, 9, and 11
<b>2.3.1 Percent of bacteriologically confirmed TB cases who are tested for drug resistance with a recorded result.</b>	<b>National 2015</b>	<b>CTB 2015</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Percent (new cases)</b> , include numerator/denominator	5%	5%	<b>Moderate</b>	Data source: Global TB Report 2016 (numerator and denominator not provided).  Per NTP 2016 report, there were 3,166 bacteriologically confirmed cases from relapsed patients, and 113,948 bacteriologically confirmed cases from new / no history patients.
<b>Percent (previously treated cases)</b> , include numerator/denominator	63%	63%		
<b>Percent (total cases)</b> , include numerator/denominator				
<b>3.1.1. Number and percent of cases notified by setting (i.e. private sector, pharmacies, prisons, etc.) and/or population (i.e. gender, children, miners, urban slums, etc.) and/or case finding approach</b>	<b>National APA2</b>	<b>CTB APA2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Number and percent</b>	<i>Fill in data in "Ind 3.1.1 - APA 2" worksheet</i>	<i>Fill in data in "Ind 3.1.1 - APA 2" worksheet</i>	<b>Substantial</b>	
<b>3.1.4. Number of RR-TB or MDR-TB cases notified</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
Total 2015	896	896	<b>Substantial</b>	MDR case detection data is taken from Laboratory data.  NTP data is expected to be available the
Jan-Mar 2016	242	242		

Apr-June 2016	280	280		last week of November 2016.
Jul-Sept 2016	228	228		
To date in 2016	750	750		
<b>3.2.1. Number and percent of TB cases successfully treated (all forms) by setting (i.e. private sector, pharmacies, prisons, etc.) and/or by population (i.e. gender, children, miners, urban slums, etc.).</b>	<b>National 2014 cohort</b>	<b>CTB 2014 cohort</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Number and percent</b> of TB cases successfully treated in a calendar year cohort	94.32% (106,721/100,658)	94.32% (106,721/100,658)	<b>Substantial</b>	
<b>3.2.4. Number of patients started on MDR-TB treatment</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
Total 2015	880	880	<b>Substantial</b>	
Jan-Mar 2016	208	208		
Apr-June 2016	273	273		
Jul-Sept 2016	203	203		
To date in 2016	684	684		
<b>3.2.7. Number and percent of MDR-TB cases successfully treated</b>	<b>National 2013 cohort</b>	<b>CTB 2013 cohort</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>

<b>Number and percent</b> of MDR-TB cases successfully treated in a calendar year cohort	72.73 (NTP 2016 Annual report)	72.73 (NTP 2016 Annual report)	<b>Moderate</b>	
<b>5.2.3. Number and % of health care workers diagnosed with TB during reporting period</b>	<b>National 2015</b>	<b>CTB 2015</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Number and percent</b> reported annually	Not Available	Not Available	<b>None</b>	No TB surveillance among HCWs in place, and no relevant study has been conducted in 2015. The NTP has not yet agreed to track this.
<b>6.1.11. Number of children under the age of 5 years who initiate IPT</b>	<b>National 2015</b>	<b>CTB 2015</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Number</b> reported annually	6521	5692	<b>Substantial</b>	National data represent calendar year and CTB data was taken from CTB subgrantees from July 2015 to June 2016
<b>7.2.3. % of activity budget covered by private sector cost share, by specific activity</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Percent</b> as of September 30, 2016 (include numerator/denominator)	N/A	N/A	<b>None</b>	
<b>8.1.3. Status of National Stop TB Partnerships</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Score</b> as of September 30, 2016	0	N/A	<b>None</b>	No formal partnership established. While an informal Stop TB partnership has been in existence for several years, there is no motion towards formalization.

<b>8.1.4. % of local partners' operating budget covered by diverse non-USG funding sources</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Percent</b> as of September 30, 2016 (include numerator/denominator)	N/A	98% (\$81,933,191 / \$83,692,638)	<b>None</b>	8 partners included
<b>8.2.1. Global Fund grant rating</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Score</b> as of September 30, 2016	BRAC-A1, NTP- A2	N/A	<b>None</b>	
<b>9.1.1. Number of stock outs of anti-TB drugs, by type (first and second line) and level (ex, national, provincial, district)</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Number</b> as of September 30, 2016	<b>0</b>	N/A	<b>None</b>	
<b>10.1.4. Status of electronic recording and reporting system</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Score</b> as of September 30, 2016	2	N/A	<b>None</b>	Patient-based data management system, e-TB Manager, has been installed in 258 upazillas through the SIAPS project. CTB's role does not include e-TB Manager, as that would duplicate SIAPS' work.

<b>10.2.1. Standards and benchmarks to certify surveillance systems and vital registration for direct measurement of TB burden have been implemented</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Yes or No</b> as of September 30, 2016	No	N/A	<b>None</b>	
<b>10.2.6. % of operations research project funding provided to local partner (provide % for each OR project)</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Percent</b> as of September 30, 2016 (include numerator/denominator)	N/A	N/A	<b>Limited</b>	In APA2, OR topics were finalized and approved by NTP, but not USAID. CTB built stakeholders' capacity in research protocol development.
<b>10.2.7. Operational research findings are used to change policy or practices (ex, change guidelines or implementation approach)</b>	<b>National APA 2</b>	<b>CTB APA 2</b>	<b>CTB APA 2 investment</b>	<b>Additional Information/Comments</b>
<b>Yes or No</b> as of September 30, 2016	N/A	No	<b>Limited</b>	No research was done in APA2

11.1.3. Number of health care workers trained, by gender and technical area	CTB APA 2		CTB APA 2 investment	Additional Information/Comments
			Moderate	
	# trained males APA 2	# trained females APA 2	Total # trained in APA 2	Total # planned trainees in APA 2
1. Enabling environment			0	
2. Comprehensive, high quality diagnostics	128	47	175	182
3. Patient-centered care and treatment	9889	899	10788	10225
4. Targeted screening for active TB			0	
5. Infection control	30	0	30	30
6. Management of latent TB infection			0	
7. Political commitment and leadership			0	
8. Comprehensive partnerships and informed community involvement			0	
9. Drug and commodity management systems			0	
10. Quality data, surveillance and M&E	195	31	226	240
11. Human resource development			0	
Other (explain)			0	
Other (explain)			0	
<b>Grand Total</b>	<b>10242</b>	<b>977</b>	<b>11219</b>	<b>10677</b>

11.1.5. % of USAID TB funding directed to local partners	National APA 2	CTB APA 2	CTB APA 2 investment	Additional Information/Comments
<b>Percent</b> as of September 30, 2016 (include numerator/denominator)	N/A	Budget: 30% (\$2,202,054 / \$7,370,654) Expenditures: 26% (\$1,479,002 / \$5,759,928)	<b>Substantial</b>	

Year/Quarter	Number of pre-/XDR-TB cases started on BDQ nationwide	Number of pre-/XDR-TB cases started on DLM nationwide	CTB APA 2 investment	Additional Information/Comments
Total 2014	0	0	<b>None</b>	IRD is leading this work with the NIDCH through a separate grant.
Total 2015	0	0		
Jan-Mar 2016	0	0		
Apr-Jun 2016	5	0		
Jul-Aug 2016	10	0		
To date in 2016	15	0		

		Reporting period					CTB APA 2 investment
		Oct-Dec 2015	Jan-Mar 2016	Apr-Jun 2016	Jul-Sept 2016	Cumulative Year 2	
Overall CTB geographic areas	TB cases (all forms) notified per CTB geographic area ( <i>List each CTB area below - i.e. Province name</i> )						Substantial
	CTB Sub-grantee area	7,666	8093	8941	7712	32412	
						0	
						0	
						0	
						0	
						0	
						0	
						0	
						0	
	TB cases (all forms) notified for all CTB areas	7666	8093	8941	7712	32412	
	All TB cases (all forms) notified nationwide (denominator)	52714	55090	57724	Not available	#VALUE!	
	% of national cases notified in CTB geographic areas	15%	15%	15%	#VALUE!	#VALUE!	
Intervention (setting/population/approach)							CTB APA 2 investment
Contact investigations	CTB geographic focus for this intervention	CTB Sub Grantees Area				#VALUE!	Limited
	TB cases (all forms) notified from this intervention	146	151	171	179	647	
	All TB cases notified in this CTB area (denominator)	7666	8093	8941	7712	32412	
	% of cases notified from this intervention	2%	2%	2%	2%	2%	

Active case finding (ACF) (e.g. case finding among key populations in the community)	CTB geographic focus for this intervention	CTB Sub Grantees Area				#VALUE!	Substantial
	TB cases (all forms) notified from this intervention	852	301	369	326	1848	
	All TB cases notified in this CTB area (denominator)	7666	8093	8941	7712	32412	
	% of cases notified from this intervention	11%	4%	4%	4%	6%	
Choose an item.	CTB geographic focus for this intervention					0	
	TB cases (all forms) notified from this intervention					0	
	All TB cases notified in this CTB area (denominator)					0	
	% of cases notified from this intervention	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

## Annex II: Status of EMMP activities

EMMP drafted & submitted to USAID; awaiting feedback. Proposed mitigation measures noted below.

Year 2 Mitigation Measures	Status of Mitigation Measures	Outstanding issues to address in Year 3	Additional Remarks
Education, technical assistance and training activities that inherently affect the environment include in the discussion of prevention and mitigation of potential negative environmental effects.	The primary training areas that impact the environment relate to proper disposal of medical and other waste, which is covered in all relevant trainings.	Continue to provide training	
Following standard procurement guidelines CTB will ensure proper procurement of supplies from authorized suppliers and it has to be open bidding competition among the listed companies. These supplies will then be delivered directly to the NTP storage facility as it would be directed during the work order to the concern parties. NTP's central ware house is located at Shaymoli, Dhaka where supplies are stored. Although the responsibility for proper storage (as per standard guideline) and distribution to the intermediate/ peripheral levels lies with the NTP, CTB concern person will advise the NTP on the proper storage and disposal as per standard	Procurement is done per standard guidelines and items are provided to the NTP and partners for appropriate use.	Continue to procure appropriately	

<p>protocol of these supplies based on the information provided on the manufacturer's safety data sheet in order to ensure compliance to the recommended environmental mitigation measures. Implementing partners will follow all host country/Bangladesh laws and regulation relevant to proper waste management and disposal.</p>			
<p>The project will ensure adaptation by the facilities the country's non-medical and medical waste management regulations and procedures and recommending that these be integrated into their training program on clinical waste management. Furthermore, usages and disposal of reagents as medical waste is included in the SOP of NTRL/RTRLs.</p> <p>Disposal of laboratory waste is included in the Tuberculosis Laboratory Bio-safety Manual, WHO (2012) that is being adapted and followed by NTRL/RTRLs, and TB Microscopy laboratories.</p> <p>During joint monitoring and supportive supervision visits</p>	<p>Supervision visits to facilities, including labs, include a review of waste management, as this is a key component of infection prevention. Issues are raised to the facility staff and leadership.</p>	<p>Continue to review waste management with facility staff and raise repeated issues to higher-level staff.</p>	

<p>CTB conducts with the NTP and WHO, the management and disposal of medical waste will be discussed and checked; when necessary, onsite demonstration and corrections will be made.</p> <p>The team assesses the overall activities of a facility through record review and visual inspection. There is a standard checklist to guide and conduct the monitoring and supervision.</p> <p>Joint monitoring and supervision to check Infection Control measures at MDR TB Treatment Initiation Centers (Hospitals) will utilize the National Guidelines and Operational Manual for PMDT (2nd edition, 2013), and the PMDT Supervision Checklist.</p> <p>Bio-safety cabinets certified regularly by a contracted company.</p> <p>The process of bio-safety cabinet certification is safely performed by the company following the NSF Standards</p> <p>The contracted company does not provide any training regarding waste</p>			
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management .They only do annual certification and provide some basic orientation on maintenance of BSCs following the NSF standards.			
<p>CTB will review any minor renovation plans prior to implementation to ensure compliance with environmentally sound rehabilitation practices as laid out in the Small Scale Construction chapter of the USAID Environmental Guidelines for Small-Scale Activities in Africa. For example, no lead paint will be used and excess materials will be recycled or disposed of in an environmentally sound manner.</p> <p>The Directorate General for Environmental Services, in collaboration with the Directorate General for Health Services, will conduct regular (sometimes random) site inspections to ensure that public health standards are met and in line with national policy/regulations.</p> <p>Training of staff on laboratory operations, including waste management. This training is based on routine operations</p>	<p>CTB has not been involved in renovation plans to date.</p> <p>Training related to the containerized lab has not yet been done, as the lab is not yet operational. An Effluent Decontamination System has been incorporated into the lab, and will be installed by the subcontractor when they operationalize the lab.</p>	All activities related to the containerized lab in Sylhet remain important in APA3.	

<p>of a pre-fabricated containerized laboratory; especially in the performance of safe and effective TB culture and DST (phenotypic and molecular), microscopy techniques, manage laboratory waste.</p> <p>Assist in securing the required environmental clearance [Submitted to the Department of Environment during TB CARE II. CTB assisting government in following-up.]</p> <p>Incorporate a waste decontamination plant.</p> <p>Contaminated effluents of prefabricated containerized laboratory need to be treated before disposing into the municipal sewerage system. So a decontamination plant has been planned to be incorporated in the laboratory to make the effluents safe for the environment and people.</p>			

### Annex III: Previous TB Treatment History Form



Government of the People's Republic of Bangladesh  
National Tuberculosis Control Programme  
Directorate General of Health Services  
Mohakhali, Dhaka-1212  
**Previous TB Treatment History Form**

Preserve this record attached with TB patient treatment card

Seal of the Health

Facility

**A. Particulars of the patient**

Name .....

Lab Serial. No.....

**B. Diagnosis:** Pulmonary ☐ Extra pulmonary ☐

**C. History: (related to TB treatment )**

Did you take Anti TB treatment before ..... Yes ☐ No ☐

**If yes,**

a) Private ☐ Government ☐

Hints: (Enquire: urine orange or red color... Yes ☐ No ☐

In doubtful case- Ask about duration of injection.....)

b) Do you have TB Prescription ☐ TB Treatment Card ☐ TB Patient ID Card ☐

c) How many occasions you received TB Treatment?.....

d) Category of TB treatment received..

CAT-I ☐

CAT-II ☐

DR TB ☐

Others ☐

e) Did you complete the treatment ?

I. Yes ☐

II. No ☐

Duration (if No)-

< 1 month ☐

>1 month ☐

Do not know ☐

**D. Contact History with-** TB Patient ☐ DR TB ☐ No ☐

**Signature & date .....**

**Name .....**

**Designation .....**

**Organization .....**

## **Annex IV: Infection Control Supervision Checklist**

### **Supervision Checklist**

National Tuberculosis Control Program Bangladesh

## **12. Infection Control**

### ***12.1 Any designated person coordinating body to supervise TB Infection Control in the facility***

Yes ☐      No ☐      Comments

### ***12.2 How many health care workers have been trained in TB Infection Control?***

Yes ☐      No ☐      Comments

### ***12.3 Are any ACSM/IEC materials (for example leaflets, stickers, posters ) on TB/IC available and used?***

Yes ☐      No ☐      Comments

### ***12.4 Appropriate ventilation present in facility?***

Yes ☐      No ☐      Comments

### ***12.5 Provision for separation and fast track in place?***

Yes ☐      No ☐      Comments

### ***12.6 Sputum collection slide processing and disposal are being ensured following guidelines***

Yes ☐      No ☐      Comments

**Annex V: Posters prepared for the Union Conference**  
(attached separately)